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)**

Programme 1 – BSc

In Greek:

Προπτυχιακό Πρόγραμμα στη Χημική Μηχανική (4 έτη, 240 ECTS)

In English:

Undergraduate Programme in Chemical Engineering (4 years, 240 ECTS

Language(s) of instruction: Greek

Programme 2 – PhD[Title 2]

In Greek:

Διδακτορικό Πρόγραμμα στη Χημική Μηχανική και Περιβαλλοντική Τεχνολογία (3 έτη, 240 ECTS)

In English:

PhD Programme in Chemical Engineering and Environmental Technology (3 years, 240 ECTS)

Language(s) of instruction: Greek

- **Programme's status:** Choose Status
- **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 300.1.1/1 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. The answers' documentation should be brief and accurate and supported by the relevant documentation. Referral to annexes should be made only when necessary.*

- *In particular, under each assessment area and by using the 2nd column of each table, the HEI must respond on the following:*

  - *the areas of improvement and recommendations of the EEC*
  - *the conclusions and final remarks noted by the EEC*

- *The institution should respond to the EEC comments, in the designated area next each comment. The comments of the EEC should be copied from the EEC report **without any interference** in the content.*

- *In case of annexes, those should be attached and sent on separate document(s). Each document should be in *.pdf format and named as annex1, annex2, etc.*

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

Areas of improvement and recommendations for BSc

Q1) Enhance the involvement of external stakeholders, including employers, industrial practitioners, and subject experts from other institutions, especially those in recognized research environments.

Actions Taken by the Institution

AN1) Such involvement of external stakeholders has already been done to a certain extent. For example, we have stated that several laboratory exercises are conducted or are planned to be conducted at different industries where employees provide their knowledge to the students. Specifically, the students of CEN 302 "Chemical Technology Laboratory" conduct a lab exercise at the Innovating Environmental Solutions Center (IESC Ltd) located in Limassol. The Department aims to further strengthen the programme by providing an additional lab exercise of CEN 302 at the premises of a relevant industry. Moreover, the practical training course (CEN 309) takes place in the industry, while the Department organizes several events (e.g. invited talks from the industry and public sector, workshops, practical training courses/sessions) with the participation of various stakeholders. These actions will be further extended over the next few years.

Q2) Increase the frequency of course and program reviews, considering an annual or biennial cycle to ensure ongoing improvement. Given the program's relative newness, the recent completion of a program review cycle is unclear.

Actions Taken by the Institution

AN2) The program is revised constantly by the Departmental Undergraduate Studies Committee (USC). The specific committee is responsible for constantly monitoring the programme, taking action to propose solutions when problems arise as well as to inform the Departmental Board about cases that cannot be independently solved by USC. An annual review of the programme will be targeted, between the USC and student representatives.

Q3) Conduct a top-down review of the program to course level to address repetitions, and include topics such as computer applications, programming, artificial intelligence and machine learning, engineering thermodynamics, sustainability and ethics, process safety, group design, and teamwork throughout the curriculum.

Actions Taken by the Institution

AN3) a) We have conducted a complete review of the curriculum and we have indeed identified a few cases of repetition. An important case is the introduction of students to mass and energy balances in CEN 111 "Introduction to Chemical Engineering", which are also taught in more detail during CEN 206 "Mass and Energy Balance". However, it should be noted that the introduction in CEN 111 constitutes only an introductory course, which is needed to cover the rest of the material. Thus, the description of the specific course has been modified aiming to clarify that the teaching of

mass and energy balances in CEN 111 consists only introductory material. Moreover, in CEN 204 "Applied Thermodynamics I" students are taught chemical kinetics, which is additionally taught in CEN 210 "Chemical Reaction Engineering". Since chemical kinetics, as pointed out by the EEC, is not relevant content to a thermodynamics course, we have removed the specific material from the description of CEN 204 and thermodynamics content has been added instead. The revised course descriptions are provided in Annex 1.

b) Aiming to introduce students to Aspen Hysys simulations prior teaching of CEN 311, based on a point raised by the EEC during the meeting with the teaching staff on May 26th 2023, a few simple simulations in the Unit operations courses (CEN 209 "Unit Operations I" and CEN 327 "Unit Operations II") as well as CEN 307 "Chemical Reactor Design and Installation" will be included. For example, during an additional tutorial of CEN 209 students could be instructed on the use of simple modules of Hysys and perform the simulation of a pump and a heat exchanger operation to meet specific conditions (e.g. calculation of the cold fluid flow rate to reach a prespecified exit temperature of the hot fluid). Similarly, during CEN 327 students could simulate the distillation process of a multi-component mixture and of an adsorption column, while in CEN 307 the non-isothermal operation of chemical reactors (which usually cannot be solved analytically) could be simulated. In the same courses (CEN 209, CEN 307 and CEN 327), it has been clarified that the project given to students is computational using Matlab and performed in groups. The revised descriptions of the aforementioned courses are also provided in Annex I.

c) The content of CEN 305 has been almost completely revised to introduce additional engineering thermodynamics material. We have also decided to convert the Environmental Chemical Engineering Specialization module CEN 321 "Wastewater and Liquid Waste Treatment Technologies" into a core module given its high importance to Chemical Engineers. Furthermore, the content of the course has been modified to cover more sustainability issues as per the Committee's suggestion. The revised description is available in Annex 1. Based on this change, one module from the Petrochemical Engineering Specialization should be removed. We have selected CEN 329 "Detection and Utilization of Hydrocarbon Reservoirs" which is the course least related to Chemical Engineering. However, given that the modified curriculum will be applicable to students enrolling in September 2023, the specific change will be implemented after 2 years (the inclusion of more sustainability related content will be applied immediately though). The revised course descriptions of both CEN 305 and CEN 321 are also provided in Annex I.

d) Regarding process and lab safety issues, such topics are always covered during the introductory lecture in every laboratory course. Based on the comment of the committee, the specific topic has been now included in the introductory course CEN 100 "Professional Skills for Chemical Engineers" of the first semester (see Annex I for the revised description).

e) Aiming to add further computational courses, we need to remove courses already included in the curriculum. As discussed during the meeting, the objective here is to remove non-essential Engineering courses such as CEN 213 "Engineering Mechanics" and CEN 306 "Electrical Circuits" and replace them with new computational courses. Given that both courses that should be removed comprise a suggestion, since the establishment of the Chemical Engineering programme of CUT, by the Cyprus Scientific and Technical Chamber (CSTC), prior their removal from the curriculum the specific change should be first confirmed with CSTC. However, we have enriched in the meantime

the description of CEN 301 "Dynamic Simulation with the Use of Computers" (see Annex I for the revised description).

Areas of improvement and recommendations for PhD

Q4) Consider enhancing the involvement of subject experts from recognized research environments in the evaluation committee for theses.

Actions Taken by the Institution

AN4) According to the University's regulations, external members of the PhD dissertation Examination Committee must possess expertise relevant to the subject of the dissertation and comply with specified regulations. Additionally, it is essential to avoid any conflict of interest between the student and external evaluators. Therefore, each member of the Examination Committee, apart from the Research Advisor, is required to submit a statement declaring any potential conflict of interest. The composition of the examination committee, including a declaration of the relevance of the research expertise of each member to the topic of the PhD Thesis, is approved first by the Departmental Board followed by the Faculty Board. To ensure that the members of the Examination Committee are indeed experts in the topic of the PhD Thesis, the research advisor should document their qualifications and expertise. This documentation should be presented in a comprehensive manner to the Departmental Board, providing detailed information about the external members' backgrounds and areas of specialization. According to University's regulations, at least one external examiner (coming from a different University or Institution) should be included in the external committee, while the additional examiner of the committee could be either an internal or external faculty member. Thus, although University regulations already require the involvement of external subject experts in the PhD Examination Committee, the Department will further promote the inclusion of experts from recognized research environments to enhance the quality of the programme.

Q5) Offer optional short courses in research methods, programming, career planning, project management, and other relevant areas to all PhD students, tailoring recommendations to individual students' needs.

Actions Taken by the Institution

AN5) The Department of Chemical Engineering (DCE) has implemented several strategies and will implement even more if necessary to enhance the learning experiences of its PhD students. The following points outline the initiatives and resources offered by the Department:

a) Through the Learning Development Network (LDN) of Cyprus University of Technology (CUT), PhD students can participate in several courses offered. LDN aims to design and implement seminars and workshops based on innovative teaching practices, promote the exchange of good teaching practices, contribute to the long-term educational policy of the University, provide continuous support for academic practice, and coordinate and operate new, creative learning spaces at the University (https://ldn.cut.ac.cy/). DCE should specify the minimum number of courses offered by LDN that PhD students should attend per year.
b) The Department organizes a mandatory seminar series that PhD students are required to attend. These seminars aim to equip students with essential knowledge relevant to their research area.

The seminars include academic lectures by external researchers or professors, presentations on statistical packages and professional skills training. Moreover, neither the teaching and research staff nor the PhD students are required to pay additional tuition fees to participate in the seminars.

c) The LDN of CUT organizes a Summer School every year for doctoral students from the 8 Universities participating in the alliance of the European University of Technology (EUt+). The Summer School program includes lectures, discussions, exercises and networking activities delivered in English. The Summer School aims to introduce students to their new role as PhD candidates and provide them with tools to manage projects, research education, work/life balance and collaboration with supervisors. The first-year PhD students of DCE will be encouraged to attend this course.

d) Through research-funded projects, workshops or training schools are organized by faculty members of the Department, providing opportunities for PhD students to attend. For example, the specialized training school "Ecofriendly multipurpose Biobased Products from municipal biowaste" was organized by LIFE EBP (a LIFE+ project focused on the valorization of the organic fraction of municipal solid waste for fertilizer production in agricultural applications https://www.lifeebp.eu/resources/posts/8/Leaflet%20EBP%20A5.pdf) between 13-14 October 2022 in Limassol at the premises of CUT. Moreover, the "An ocean of opportunities" hybrid training school on bridging the gap between applied sciences and commercialization potential with an in-depth workshop on communication and pitching the idea was organized at the premises of CUT, the Cyprus Marine Aquaculture Research Center of the DFMR and the Cyprus Marine and Maritime Institute between 2-6 May 2022. The training school was supported by the COST Action Ocean4Biotech (CA18238), the Junior Achievements Cyprus, the European University of Technology and the XPRO Consulting Limited, Cyprus (see also https://www.cmmi.blue/an-ocean-of-opportunities-hybrid-training-school/).

Student – centred learning, teaching and assessment

(ESG 1.3)

Areas of improvement and recommendations for BSc

Process of teaching and learning and student-centered teaching methodology

Q1) The process of teaching and learning should support students' individual and social development, including the development of national and European identity, social responsibility and active citizenship initiatives for chemical communities/industrial areas of Cyprus. The Head of department could follow the 4 purposes of higher education of the Council of Europe.

Actions Taken by the Institution

AN1) The 4 major purposes for higher education as identified by the Council of Europe are as follows: a) preparation for the labor market, b) preparation for life as active citizens in democratic societies, c) personal development and d) development of a broad and advanced knowledge base. Some of these are actually dealt with at university level, by one of the support groups of LDN (htttp://ldn.cut.ac.cy/el/) in CUT, that offers academic learning support and aims at developing the study and learning skills of students, including doctoral students and researchers, by offering training programmes in teaching and research skills, as well as in skills of writing research proposals.

LDN offers a series of integrated courses (seminars) on topics related to strengthening the knowledge and skills of both postgraduate and doctoral students. A few online seminars delivered over the past 2 years include the following topics: "Doctoral deadlines and selfcare" (this seminar referred to doctoral students and more specifically to the management of challenges arising from PhD studies), "Open discussion on accessibility and inclusion" (Roundtable discussion on issues of accessibility and inclusion in everyday life, student and professional life, virtual and face-to-face), and "Starting my own business: what should I know?" (the aim of the seminar was to explain basic concepts that should be known by students interested in starting their own business).

At departmental level, students also get acquainted with chemical, and other, industries through seminars given as part of courses CEN 407 "Studies and Career Interconnection Seminars I" and CEN 408 "Studies and Career Interconnection Seminars II".

Practical training

Q2) The duration of practical training of students, following discussion with them, could be possibly extended. The University could expand the list of the collaborating industries and companies that accept students for practical training and include also all the working environments in which Chemical Engineers could work in the future (public, private, remote). That would benefit both the students and also the public awareness about the department and the role of Chemical Engineering in society and in the local economy.

Actions Taken by the Institution

AN2) Although it would be desirable to extend the practical training, this is unfortunately difficult to achieve. Practical training starts upon completion of the examination period of the spring semester in early June and it should last between 4-6 weeks. If both the company and the student wish, the duration could be further extended until the end of August prior commencement of the next semester at the beginning of September. However, many companies in Cyprus substantially reduce their activity for approximately 2 weeks in August due to the vacation taken by their staff. This fact restricts

extending the duration of practical training for all students, given that it will be extremely difficult to secure the number of extended placements required to cover all students due to the aforementioned particularity.

DCE frequently updates the list of companies accepting students for practical training and, given that the programme has been active for only 6 years, the current list is increasing every year. Moreover, we would like to thank the committee for the recommendation to add organizations for practical training from the public sector. It should be noted that DCE already has students conducting their practical training in public authorities, such as the Sewerage Board of Limassol-Amathus and Larnaca Sewerage Board. Moreover, DCE has established a preliminary agreement to appoint students to the Cyprus Hydrocarbons Company (CHC), which is the National (State owned) Oil and Gas Company of Cyprus, and the Cyprus Organisation for Standardisation (CYS), which is the national standardisation body of Cyprus.

Areas of improvement and recommendations for PhD

Process of teaching and learning and student-centered teaching methodology

Q3) It would be a benefit for students to be able to take some ECTS-course credits, instead of having to rely on colleagues to learn necessary things, such as the use of MATLAB or similar.

Students are encouraged to take a more active role in creating the learning and research process and in being the future active citizens. Particularly PhD students in collaboration with administration and research officers shall be leaders in making CUT a young leader in Public Learning organizations (e.g. provide classes or mentoring for Chemeng students and public departments though CUT E--learning platform). We also suggest they be involved in making CUT a Research leader within public organizations.

Actions Taken by the Institution

AN3) PhD candidates have the option to enroll and earn credits in two undergraduate courses, as recommended by the Departmental Postgraduate Committee. If they do not possess a Master's degree, they should attend at least eight courses (up to two undergraduate and at least six postgraduate). Currently, students with a Master's degree are not required to take additional university courses, as they are credited with 60 ECTS. However, we acknowledge that there may be instances where PhD students, even those with a Master's degree, may need to acquire new knowledge or skills in order to effectively pursue their research. In these cases, students may, if they wish to, enroll to courses.
PhD students can additionally participate in the seminars offered by the LDN of CUT. Moreover, PhD candidates are obliged to participate in at least one taught laboratory course as Teaching Assistants. However, although DCE commits students for one laboratory course, the vast majority of students participate as Teaching Assistants in several courses.

Q4) The department could discuss ways for increasing the University Ranking through Research programs. First, there could be a better dissemination of ChemEng Research results of European Programs both internally with other departments of CUT and externally with other public Universities in order to make gradually an ecosystem of E-Universities in the Republic of Cyprus.

Actions Taken by the Institution

AN4) To address these suggestions, DCE plans to take the following actions:

a) Empowering PhD Students: DCE recognizes the importance of students taking an active role in shaping their learning experience and becoming future active citizens. The Department will actively collaborate with administration and research officers to provide opportunities for PhD students to lead initiatives, such as offering classes or mentoring programmes for undergraduate Chemical Engineering students and public departments through CUT's E-learning platform. This direction will not only enhance the learning experience, but also contribute to the development of leadership skills among the PhD students involved.
b) Establishing Research Leadership: Building upon the strengths of the Department's research programmes, DCE will work towards increasing the University Ranking through impactful research initiatives. Improved dissemination of Chemical Engineering research results obtained via European programmes will be prioritized, both internally within other Departments of CUT and externally with other public universities. Published papers and dissemination activities from research programmes will be communicated through departmental and university social media platforms.

2. Teaching staff
(ESG 1.5)

Areas of improvement and recommendations for BSc

Q1) Employment of more core-chemical-engineering faculty.

Actions Taken by the Institution

AN1) DCE agrees with the committee that it is essential to employ more faculty members with a first degree in Chemical Engineering. The specific requirement is part of the Strategic Plan of DCE. Towards this direction, DCE expects that two (2) more faculty members will be added in early 2024 and three (3) more by the end of 2025 based on running and planned hiring procedures.

Areas of improvement and recommendations for PhD

Q2) There are not many problems detected during this virtual visit, regarding the teaching staff of PhD programs. We do believe it would be helpful for students, enrolling with an MSc as their basis, to be able to take university courses. Presently students enrolled with an MSc degree are not supposed to do that. However, there can be a need for courses – even at PhD level – when trying to learn something new.

Actions Taken by the Institution

AN2) We would like to thank the committee for the observation that not many problems were detected during the virtual visit regarding the teaching staff in our PhD programme. DCE understands the importance of providing flexibility and opportunities for students holding a Master's degree to further enhance their knowledge and skills through university courses. As mentioned above, PhD candidates have the option to enroll and earn credits in two undergraduate courses, as recommended by the Departmental Postgraduate Committee. If they do not possess a Master's degree, they should attend at least eight courses (up to two undergraduate and at least six postgraduate). PhD students can additionally participate in the seminars offered by the LDN of CUT. Currently, students with a Master's degree are not required to take additional university courses, as they are credited with 60 ECTS. However, we acknowledge that there could be instances where PhD students, even those with a Master's degree, may need to acquire new knowledge or skills in order to effectively pursue their research.

The decision to credit 60 ECTS for students with a Master's degree is determined by the Postgraduate Studies Committee, followed by the approval of the Departmental Board. However, if a supervisor determines that a PhD student lacks the necessary background or expertise in a particular area, they have the option to propose that the student should take one or more courses to support the student. DCE strives to maintain a balance between providing students with the flexibility to pursue their research interests and ensuring they have the necessary skills and knowledge to succeed in their PhD studies. The consideration of additional courses for individual students constitutes a collaborative decision-making process between the student, their supervisor, and the relevant departmental committees.

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

Areas of improvement and recommendations for BSc

Q1) Consider streamlining a process to address cases where students may face difficulty in passing compulsory courses, such as issuing alternative awards (e.g., certificates or diplomas) with lesser requirements.

Actions Taken by the Institution

AN1) Unfortunately, alternative awards cannot be issued based on University regulations. To the best of our knowledge, public universities in Cyprus cannot issue alternative awards to accommodate cases where students face difficulty in passing specific compulsory courses.

Areas of improvement and recommendations for PhD

No specific areas of improvement identified.

4. Learning resources and student support
(ESG 1.6)

Areas of improvement and recommendations for BSc
Q1) A more integrated campus would be desirable.

Actions Taken by the Institution
AN1) DCE fully agrees that a more integrated campus would be desirable. To address this issue, the Department actively communicates and expresses its needs for a more integrated campus to the authorities of the University through the Dean of the faculty, where DCE highlights the benefits of creating spaces and initiatives that facilitate interdisciplinary interactions, shared resources and collaborative opportunities among different departments and disciplines.

Based on the University's Strategic Plan DCE is expected to move to a new building in Veregaria area situated outside the city center of Limassol. However, the specific plan requires several years to materialize and until then DCE will be confined within the dispersed premises currently available in the main campus of CUT in the center of Limassol.

Areas of improvement and recommendations for PhD
Q2) A more integrated campus would be desirable.

Actions Taken by the Institution
AN2) Please see our response in AN1 above.

5. Additional for doctoral programmes
(ALL ESG)

Areas of improvement and recommendations
Q1) The final assessment of PhD thesis may enhance the involvement of subject experts from recognized external research environments.

Actions Taken by the Institution
AN1) According to the University's regulations, external members of the PhD dissertation Examination Committee must possess expertise relevant to the subject of the dissertation. Additionally, it is essential to avoid any conflict of interest between the student and external evaluators. Therefore, each member of the Examination Committee, apart from the Research Advisor, is required to submit a statement declaring any potential conflict of interest. The composition of the examination committee, including a declaration of the relevance of the research expertise of each member to the topic of the PhD Thesis, is approved first by the Departmental Board followed by the Faculty Board. To ensure that the members of the Examination Committee are indeed experts in the topic of the PhD Thesis, the research advisor should document their qualifications and expertise. This documentation should be presented in a comprehensive manner to the Departmental Board, providing detailed information about the external members' backgrounds and areas of specialization.
Thus, although University regulations already require the involvement of external subject experts in the PhD Examination Committee, the Department will further promote the inclusion of experts from recognized research environments to enhance the quality of the programme.

7. Eligibility (Joint programme)

(ALL ESG)

N/A

Areas of improvement and recommendations **by EEC**	Actions Taken by the Institution	For Official Use ONLY
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B. Conclusions and final remarks

Recommendations:

• Q1) Recruitment of more faculty with core-chemical-engineering competences
• Q2) Better integration of facilities within the same (or closely situated) buildings
• Q3) There seems not to be much consciousness among students about representation and how to exert influence on programs, this makes the students an under-utilized resource in the development of the programs
• Q4) Somewhat more emphasis on practical operation of chemical engineering processing systems at intermediate to larger scale
• Q5) Develop access to practical experiences with larger scale processing equipment. Internships may help with this, but then internships must not reduce to analytical work only

Actions Taken by the Institution

• AN1) DCE anticipates that two (2) more faculty members will be recruited in early 2024 and three (3) more by the end of 2025.
• AN2) DCE is expected to move to a new building in Veregaria area (outside the city center of Limassol) as specified in the Strategic Plan of CUT.
• AN3) Students can bring up issues through the three (3) student representatives in the Departmental Board. Subsequently, the Departmental Undergraduate Studies Committee, which oversees handling of various tasks related to Undergraduate studies and the curriculum, is responsible to either directly resolve the issues raised by students or to inform the Departmental Board aiming to seek for optimal solutions.
• AN4+5) Currently students participate in one (1) laboratory practical experience at the IESC Innovating Environmental Solutions Center Ltd (http://www.iesc-ltd.com/) which is located in Ypsonas in Limassol as part of the laboratory exercises which are included in the course CEN 302 “Chemical Technology Laboratory”. DCE will supplement the specific course with an additional laboratory exercise that will be conducted at a relevant industry. A very small number of Internships covering analytical work only will be eliminated.

C. Higher Education Institution academic representatives

Name	*Position*	*Signature*
Michalis Koutinas	Department Chair	
Alexandros Charalambides	Program Coordinator	
Ioannis Vyrides	Postgraduate Studies Committee	
Pavlos Stefanou	Undergraduate Studies Committee	Παύλος Στεφάνου
Achilleas Konstantinou	Undergraduate Studies Committee	Αχιλλέας Κωνσταντίνου
Click to enter Name	Click to enter Position	

Date: 10/8/2023

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Doc. 300.1.2

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Cyprus University of Technology

- **Town:** Limassol
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(ESG 1.1, 1.2, 1.7, 1.8, 1.9)

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c) The content of CEN 305 has been almost completely revised to introduce additional engineering thermodynamics material. We have also decided to convert the Environmental Chemical Engineering Specialization module CEN 321 "Wastewater and Liquid Waste Treatment Technologies" into a core module given its high importance to Chemical Engineers. Furthermore, the content of the course has been modified to cover more sustainability issues as per the Committee's suggestion. The revised description is available in Annex 1. Based on this change, one module from the Petrochemical Engineering Specialization should be removed. We have selected CEN 329 "Detection and Utilization of Hydrocarbon Reservoirs" which is the course least related to Chemical Engineering. However, given that the modified curriculum will be applicable to students enrolling in September 2023, the specific change will be implemented after 2 years (the inclusion of more sustainability related content will be applied immediately though). The revised course descriptions of both CEN 305 and CEN 321 are also provided in Annex I.

d) Regarding process and lab safety issues, such topics are always covered during the introductory lecture in every laboratory course. Based on the comment of the committee, the specific topic has been now included in the introductory course CEN 100 "Professional Skills for Chemical Engineers" of the first semester (see Annex I for the revised description).

e) Aiming to add further computational courses, we need to remove courses already included in the curriculum. As discussed during the meeting, the objective here is to remove non-essential Engineering courses such as CEN 213 "Engineering Mechanics" and CEN 306 "Electrical Circuits" and replace them with new computational courses. Given that both courses that should be removed comprise a suggestion, since the establishment of the Chemical Engineering programme of CUT, by the Cyprus Scientific and Technical Chamber (CSTC), prior their removal from the curriculum the specific change should be first confirmed with CSTC. However, we have enriched in the meantime

the description of CEN 301 "Dynamic Simulation with the Use of Computers" (see Annex I for the revised description).

Areas of improvement and recommendations for PhD

Q4) Consider enhancing the involvement of subject experts from recognized research environments in the evaluation committee for theses.

Actions Taken by the Institution

AN4) According to the University's regulations, external members of the PhD dissertation Examination Committee must possess expertise relevant to the subject of the dissertation and comply with specified regulations. Additionally, it is essential to avoid any conflict of interest between the student and external evaluators. Therefore, each member of the Examination Committee, apart from the Research Advisor, is required to submit a statement declaring any potential conflict of interest. The composition of the examination committee, including a declaration of the relevance of the research expertise of each member to the topic of the PhD Thesis, is approved first by the Departmental Board followed by the Faculty Board. To ensure that the members of the Examination Committee are indeed experts in the topic of the PhD Thesis, the research advisor should document their qualifications and expertise. This documentation should be presented in a comprehensive manner to the Departmental Board, providing detailed information about the external members' backgrounds and areas of specialization. According to University's regulations, at least one external examiner (coming from a different University or Institution) should be included in the external committee, while the additional examiner of the committee could be either an internal or external faculty member. Thus, although University regulations already require the involvement of external subject experts in the PhD Examination Committee, the Department will further promote the inclusion of experts from recognized research environments to enhance the quality of the programme.

Q5) Offer optional short courses in research methods, programming, career planning, project management, and other relevant areas to all PhD students, tailoring recommendations to individual students' needs.

Actions Taken by the Institution

AN5) The Department of Chemical Engineering (DCE) has implemented several strategies and will implement even more if necessary to enhance the learning experiences of its PhD students. The following points outline the initiatives and resources offered by the Department:

a) Through the Learning Development Network (LDN) of Cyprus University of Technology (CUT), PhD students can participate in several courses offered. LDN aims to design and implement seminars and workshops based on innovative teaching practices, promote the exchange of good teaching practices, contribute to the long-term educational policy of the University, provide continuous support for academic practice, and coordinate and operate new, creative learning spaces at the University (https://ldn.cut.ac.cy/). DCE should specify the minimum number of courses offered by LDN that PhD students should attend per year.
b) The Department organizes a mandatory seminar series that PhD students are required to attend. These seminars aim to equip students with essential knowledge relevant to their research area.

The seminars include academic lectures by external researchers or professors, presentations on statistical packages and professional skills training. Moreover, neither the teaching and research staff nor the PhD students are required to pay additional tuition fees to participate in the seminars.

c) The LDN of CUT organizes a Summer School every year for doctoral students from the 8 Universities participating in the alliance of the European University of Technology (EUt+). The Summer School program includes lectures, discussions, exercises and networking activities delivered in English. The Summer School aims to introduce students to their new role as PhD candidates and provide them with tools to manage projects, research education, work/life balance and collaboration with supervisors. The first-year PhD students of DCE will be encouraged to attend this course.

d) Through research-funded projects, workshops or training schools are organized by faculty members of the Department, providing opportunities for PhD students to attend. For example, the specialized training school "Ecofriendly multipurpose Biobased Products from municipal biowaste" was organized by LIFE EBP (a LIFE+ project focused on the valorization of the organic fraction of municipal solid waste for fertilizer production in agricultural applications https://www.lifeebp.eu/resources/posts/8/Leaflet%20EBP%20A5.pdf) between 13-14 October 2022 in Limassol at the premises of CUT. Moreover, the "An ocean of opportunities" hybrid training school on bridging the gap between applied sciences and commercialization potential with an in-depth workshop on communication and pitching the idea was organized at the premises of CUT, the Cyprus Marine Aquaculture Research Center of the DFMR and the Cyprus Marine and Maritime Institute between 2-6 May 2022. The training school was supported by the COST Action Ocean4Biotech (CA18238), the Junior Achievements Cyprus, the European University of Technology and the XPRO Consulting Limited, Cyprus (see also https://www.cmmi.blue/an-ocean-of-opportunities-hybrid-training-school/).

Student – centred learning, teaching and assessment

(ESG 1.3)

Areas of improvement and recommendations for BSc

Process of teaching and learning and student-centered teaching methodology

Q1) The process of teaching and learning should support students' individual and social development, including the development of national and European identity, social responsibility and active citizenship initiatives for chemical communities/industrial areas of Cyprus. The Head of department could follow the 4 purposes of higher education of the Council of Europe.

Actions Taken by the Institution

AN1) The 4 major purposes for higher education as identified by the Council of Europe are as follows: a) preparation for the labor market, b) preparation for life as active citizens in democratic societies, c) personal development and d) development of a broad and advanced knowledge base. Some of these are actually dealt with at university level, by one of the support groups of LDN (htttp://ldn.cut.ac.cy/el/) in CUT, that offers academic learning support and aims at developing the study and learning skills of students, including doctoral students and researchers, by offering training programmes in teaching and research skills, as well as in skills of writing research proposals.

LDN offers a series of integrated courses (seminars) on topics related to strengthening the knowledge and skills of both postgraduate and doctoral students. A few online seminars delivered over the past 2 years include the following topics: "Doctoral deadlines and selfcare" (this seminar referred to doctoral students and more specifically to the management of challenges arising from PhD studies), "Open discussion on accessibility and inclusion" (Roundtable discussion on issues of accessibility and inclusion in everyday life, student and professional life, virtual and face-to-face), and "Starting my own business: what should I know?" (the aim of the seminar was to explain basic concepts that should be known by students interested in starting their own business).

At departmental level, students also get acquainted with chemical, and other, industries through seminars given as part of courses CEN 407 "Studies and Career Interconnection Seminars I" and CEN 408 "Studies and Career Interconnection Seminars II".

Practical training

Q2) The duration of practical training of students, following discussion with them, could be possibly extended. The University could expand the list of the collaborating industries and companies that accept students for practical training and include also all the working environments in which Chemical Engineers could work in the future (public, private, remote). That would benefit both the students and also the public awareness about the department and the role of Chemical Engineering in society and in the local economy.

Actions Taken by the Institution

AN2) Although it would be desirable to extend the practical training, this is unfortunately difficult to achieve. Practical training starts upon completion of the examination period of the spring semester in early June and it should last between 4-6 weeks. If both the company and the student wish, the duration could be further extended until the end of August prior commencement of the next semester at the beginning of September. However, many companies in Cyprus substantially reduce their activity for approximately 2 weeks in August due to the vacation taken by their staff. This fact restricts

extending the duration of practical training for all students, given that it will be extremely difficult to secure the number of extended placements required to cover all students due to the aforementioned particularity.

DCE frequently updates the list of companies accepting students for practical training and, given that the programme has been active for only 6 years, the current list is increasing every year. Moreover, we would like to thank the committee for the recommendation to add organizations for practical training from the public sector. It should be noted that DCE already has students conducting their practical training in public authorities, such as the Sewerage Board of Limassol-Amathus and Larnaca Sewerage Board. Moreover, DCE has established a preliminary agreement to appoint students to the Cyprus Hydrocarbons Company (CHC), which is the National (State owned) Oil and Gas Company of Cyprus, and the Cyprus Organisation for Standardisation (CYS), which is the national standardisation body of Cyprus.

Areas of improvement and recommendations for PhD

Process of teaching and learning and student-centered teaching methodology

Q3) It would be a benefit for students to be able to take some ECTS-course credits, instead of having to rely on colleagues to learn necessary things, such as the use of MATLAB or similar.

Students are encouraged to take a more active role in creating the learning and research process and in being the future active citizens. Particularly PhD students in collaboration with administration and research officers shall be leaders in making CUT a young leader in Public Learning organizations (e.g. provide classes or mentoring for Chemeng students and public departments though CUT E--learning platform). We also suggest they be involved in making CUT a Research leader within public organizations.

Actions Taken by the Institution

AN3) PhD candidates have the option to enroll and earn credits in two undergraduate courses, as recommended by the Departmental Postgraduate Committee. If they do not possess a Master's degree, they should attend at least eight courses (up to two undergraduate and at least six postgraduate). Currently, students with a Master's degree are not required to take additional university courses, as they are credited with 60 ECTS. However, we acknowledge that there may be instances where PhD students, even those with a Master's degree, may need to acquire new knowledge or skills in order to effectively pursue their research. In these cases, students may, if they wish to, enroll to courses.
PhD students can additionally participate in the seminars offered by the LDN of CUT. Moreover, PhD candidates are obliged to participate in at least one taught laboratory course as Teaching Assistants. However, although DCE commits students for one laboratory course, the vast majority of students participate as Teaching Assistants in several courses.

Q4) The department could discuss ways for increasing the University Ranking through Research programs. First, there could be a better dissemination of ChemEng Research results of European Programs both internally with other departments of CUT and externally with other public Universities in order to make gradually an ecosystem of E-Universities in the Republic of Cyprus.

Actions Taken by the Institution

AN4) To address these suggestions, DCE plans to take the following actions:

a) Empowering PhD Students: DCE recognizes the importance of students taking an active role in shaping their learning experience and becoming future active citizens. The Department will actively collaborate with administration and research officers to provide opportunities for PhD students to lead initiatives, such as offering classes or mentoring programmes for undergraduate Chemical Engineering students and public departments through CUT's E-learning platform. This direction will not only enhance the learning experience, but also contribute to the development of leadership skills among the PhD students involved.
b) Establishing Research Leadership: Building upon the strengths of the Department's research programmes, DCE will work towards increasing the University Ranking through impactful research initiatives. Improved dissemination of Chemical Engineering research results obtained via European programmes will be prioritized, both internally within other Departments of CUT and externally with other public universities. Published papers and dissemination activities from research programmes will be communicated through departmental and university social media platforms.

2. Teaching staff
(ESG 1.5)

Areas of improvement and recommendations for BSc

Q1) Employment of more core-chemical-engineering faculty.

Actions Taken by the Institution

AN1) DCE agrees with the committee that it is essential to employ more faculty members with a first degree in Chemical Engineering. The specific requirement is part of the Strategic Plan of DCE. Towards this direction, DCE expects that two (2) more faculty members will be added in early 2024 and three (3) more by the end of 2025 based on running and planned hiring procedures.

Areas of improvement and recommendations for PhD

Q2) There are not many problems detected during this virtual visit, regarding the teaching staff of PhD programs. We do believe it would be helpful for students, enrolling with an MSc as their basis, to be able to take university courses. Presently students enrolled with an MSc degree are not supposed to do that. However, there can be a need for courses – even at PhD level – when trying to learn something new.

Actions Taken by the Institution

AN2) We would like to thank the committee for the observation that not many problems were detected during the virtual visit regarding the teaching staff in our PhD programme. DCE understands the importance of providing flexibility and opportunities for students holding a Master's degree to further enhance their knowledge and skills through university courses. As mentioned above, PhD candidates have the option to enroll and earn credits in two undergraduate courses, as recommended by the Departmental Postgraduate Committee. If they do not possess a Master's degree, they should attend at least eight courses (up to two undergraduate and at least six postgraduate). PhD students can additionally participate in the seminars offered by the LDN of CUT. Currently, students with a Master's degree are not required to take additional university courses, as they are credited with 60 ECTS. However, we acknowledge that there could be instances where PhD students, even those with a Master's degree, may need to acquire new knowledge or skills in order to effectively pursue their research.

The decision to credit 60 ECTS for students with a Master's degree is determined by the Postgraduate Studies Committee, followed by the approval of the Departmental Board. However, if a supervisor determines that a PhD student lacks the necessary background or expertise in a particular area, they have the option to propose that the student should take one or more courses to support the student. DCE strives to maintain a balance between providing students with the flexibility to pursue their research interests and ensuring they have the necessary skills and knowledge to succeed in their PhD studies. The consideration of additional courses for individual students constitutes a collaborative decision-making process between the student, their supervisor, and the relevant departmental committees.

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

Areas of improvement and recommendations for BSc

Q1) Consider streamlining a process to address cases where students may face difficulty in passing compulsory courses, such as issuing alternative awards (e.g., certificates or diplomas) with lesser requirements.

Actions Taken by the Institution

AN1) Unfortunately, alternative awards cannot be issued based on University regulations. To the best of our knowledge, public universities in Cyprus cannot issue alternative awards to accommodate cases where students face difficulty in passing specific compulsory courses.

Areas of improvement and recommendations for PhD

No specific areas of improvement identified.

4. Learning resources and student support
(ESG 1.6)

Areas of improvement and recommendations for BSc
Q1) A more integrated campus would be desirable.

Actions Taken by the Institution
AN1) DCE fully agrees that a more integrated campus would be desirable. To address this issue, the Department actively communicates and expresses its needs for a more integrated campus to the authorities of the University through the Dean of the faculty, where DCE highlights the benefits of creating spaces and initiatives that facilitate interdisciplinary interactions, shared resources and collaborative opportunities among different departments and disciplines.

Based on the University's Strategic Plan DCE is expected to move to a new building in Veregaria area situated outside the city center of Limassol. However, the specific plan requires several years to materialize and until then DCE will be confined within the dispersed premises currently available in the main campus of CUT in the center of Limassol.

Areas of improvement and recommendations for PhD
Q2) A more integrated campus would be desirable.

Actions Taken by the Institution
AN2) Please see our response in AN1 above.

5. Additional for doctoral programmes
(ALL ESG)

Areas of improvement and recommendations
Q1) The final assessment of PhD thesis may enhance the involvement of subject experts from recognized external research environments.

Actions Taken by the Institution
AN1) According to the University's regulations, external members of the PhD dissertation Examination Committee must possess expertise relevant to the subject of the dissertation. Additionally, it is essential to avoid any conflict of interest between the student and external evaluators. Therefore, each member of the Examination Committee, apart from the Research Advisor, is required to submit a statement declaring any potential conflict of interest. The composition of the examination committee, including a declaration of the relevance of the research expertise of each member to the topic of the PhD Thesis, is approved first by the Departmental Board followed by the Faculty Board. To ensure that the members of the Examination Committee are indeed experts in the topic of the PhD Thesis, the research advisor should document their qualifications and expertise. This documentation should be presented in a comprehensive manner to the Departmental Board, providing detailed information about the external members' backgrounds and areas of specialization.
Thus, although University regulations already require the involvement of external subject experts in the PhD Examination Committee, the Department will further promote the inclusion of experts from recognized research environments to enhance the quality of the programme.

7. Eligibility (Joint programme)

(ALL ESG)

N/A

Areas of improvement and recommendations **by EEC**	Actions Taken by the Institution	For Official Use ONLY
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Click or tap here to enter text.	Click or tap here to enter text.	Choose level of compliance:

B. Conclusions and final remarks

Recommendations:

• Q1) Recruitment of more faculty with core-chemical-engineering competences
• Q2) Better integration of facilities within the same (or closely situated) buildings
• Q3) There seems not to be much consciousness among students about representation and how to exert influence on programs, this makes the students an under-utilized resource in the development of the programs
• Q4) Somewhat more emphasis on practical operation of chemical engineering processing systems at intermediate to larger scale
• Q5) Develop access to practical experiences with larger scale processing equipment. Internships may help with this, but then internships must not reduce to analytical work only

Actions Taken by the Institution

• AN1) DCE anticipates that two (2) more faculty members will be recruited in early 2024 and three (3) more by the end of 2025.
• AN2) DCE is expected to move to a new building in Veregaria area (outside the city center of Limassol) as specified in the Strategic Plan of CUT.
• AN3) Students can bring up issues through the three (3) student representatives in the Departmental Board. Subsequently, the Departmental Undergraduate Studies Committee, which oversees handling of various tasks related to Undergraduate studies and the curriculum, is responsible to either directly resolve the issues raised by students or to inform the Departmental Board aiming to seek for optimal solutions.
• AN4+5) Currently students participate in one (1) laboratory practical experience at the IESC Innovating Environmental Solutions Center Ltd (http://www.iesc-ltd.com/) which is located in Ypsonas in Limassol as part of the laboratory exercises which are included in the course CEN 302 “Chemical Technology Laboratory”. DCE will supplement the specific course with an additional laboratory exercise that will be conducted at a relevant industry. A very small number of Internships covering analytical work only will be eliminated.

C. Higher Education Institution academic representatives

Name	*Position*	*Signature*
Michalis Koutinas	Department Chair	
Alexandros Charalambides	Program Coordinator	
Ioannis Vyrides	Postgraduate Studies Committee	
Pavlos Stefanou	Undergraduate Studies Committee	Παύλος Στεφάνου
Achilleas Konstantinou	Undergraduate Studies Committee	Αχιλλέας Κωνσταντίνου
Click to enter Name	Click to enter Position	

Date: 10/8/2023

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e-mail: info@dipae.ac.cy

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)**

Programme 1 – BSc

In Greek:

Προπτυχιακό Πρόγραμμα στη Χημική Μηχανική (4 έτη, 240 ECTS)

In English:

Undergraduate Programme in Chemical Engineering (4 years, 240 ECTS

Language(s) of instruction: Greek

Programme 2 – PhD[Title 2]

In Greek:

Διδακτορικό Πρόγραμμα στη Χημική Μηχανική και Περιβαλλοντική Τεχνολογία (3 έτη, 240 ECTS)

In English:

PhD Programme in Chemical Engineering and Environmental Technology (3 years, 240 ECTS)

Language(s) of instruction: Greek

- **Programme's status:** Choose Status
- **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 300.1.1/1 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. The answers' documentation should be brief and accurate and supported by the relevant documentation. Referral to annexes should be made only when necessary.*

- *In particular, under each assessment area and by using the 2nd column of each table, the HEI must respond on the following:*

  - *the areas of improvement and recommendations of the EEC*
  - *the conclusions and final remarks noted by the EEC*

- *The institution should respond to the EEC comments, in the designated area next each comment. The comments of the EEC should be copied from the EEC report **without any interference** in the content.*

- *In case of annexes, those should be attached and sent on separate document(s). Each document should be in *.pdf format and named as annex1, annex2, etc.*

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

Areas of improvement and recommendations for BSc

Q1) Enhance the involvement of external stakeholders, including employers, industrial practitioners, and subject experts from other institutions, especially those in recognized research environments.

Actions Taken by the Institution

AN1) Such involvement of external stakeholders has already been done to a certain extent. For example, we have stated that several laboratory exercises are conducted or are planned to be conducted at different industries where employees provide their knowledge to the students. Specifically, the students of CEN 302 "Chemical Technology Laboratory" conduct a lab exercise at the Innovating Environmental Solutions Center (IESC Ltd) located in Limassol. The Department aims to further strengthen the programme by providing an additional lab exercise of CEN 302 at the premises of a relevant industry. Moreover, the practical training course (CEN 309) takes place in the industry, while the Department organizes several events (e.g. invited talks from the industry and public sector, workshops, practical training courses/sessions) with the participation of various stakeholders. These actions will be further extended over the next few years.

Q2) Increase the frequency of course and program reviews, considering an annual or biennial cycle to ensure ongoing improvement. Given the program's relative newness, the recent completion of a program review cycle is unclear.

Actions Taken by the Institution

AN2) The program is revised constantly by the Departmental Undergraduate Studies Committee (USC). The specific committee is responsible for constantly monitoring the programme, taking action to propose solutions when problems arise as well as to inform the Departmental Board about cases that cannot be independently solved by USC. An annual review of the programme will be targeted, between the USC and student representatives.

Q3) Conduct a top-down review of the program to course level to address repetitions, and include topics such as computer applications, programming, artificial intelligence and machine learning, engineering thermodynamics, sustainability and ethics, process safety, group design, and teamwork throughout the curriculum.

Actions Taken by the Institution

AN3) a) We have conducted a complete review of the curriculum and we have indeed identified a few cases of repetition. An important case is the introduction of students to mass and energy balances in CEN 111 "Introduction to Chemical Engineering", which are also taught in more detail during CEN 206 "Mass and Energy Balance". However, it should be noted that the introduction in CEN 111 constitutes only an introductory course, which is needed to cover the rest of the material. Thus, the description of the specific course has been modified aiming to clarify that the teaching of

mass and energy balances in CEN 111 consists only introductory material. Moreover, in CEN 204 "Applied Thermodynamics I" students are taught chemical kinetics, which is additionally taught in CEN 210 "Chemical Reaction Engineering". Since chemical kinetics, as pointed out by the EEC, is not relevant content to a thermodynamics course, we have removed the specific material from the description of CEN 204 and thermodynamics content has been added instead. The revised course descriptions are provided in Annex 1.

b) Aiming to introduce students to Aspen Hysys simulations prior teaching of CEN 311, based on a point raised by the EEC during the meeting with the teaching staff on May 26th 2023, a few simple simulations in the Unit operations courses (CEN 209 "Unit Operations I" and CEN 327 "Unit Operations II") as well as CEN 307 "Chemical Reactor Design and Installation" will be included. For example, during an additional tutorial of CEN 209 students could be instructed on the use of simple modules of Hysys and perform the simulation of a pump and a heat exchanger operation to meet specific conditions (e.g. calculation of the cold fluid flow rate to reach a prespecified exit temperature of the hot fluid). Similarly, during CEN 327 students could simulate the distillation process of a multi-component mixture and of an adsorption column, while in CEN 307 the non-isothermal operation of chemical reactors (which usually cannot be solved analytically) could be simulated. In the same courses (CEN 209, CEN 307 and CEN 327), it has been clarified that the project given to students is computational using Matlab and performed in groups. The revised descriptions of the aforementioned courses are also provided in Annex I.

c) The content of CEN 305 has been almost completely revised to introduce additional engineering thermodynamics material. We have also decided to convert the Environmental Chemical Engineering Specialization module CEN 321 "Wastewater and Liquid Waste Treatment Technologies" into a core module given its high importance to Chemical Engineers. Furthermore, the content of the course has been modified to cover more sustainability issues as per the Committee's suggestion. The revised description is available in Annex 1. Based on this change, one module from the Petrochemical Engineering Specialization should be removed. We have selected CEN 329 "Detection and Utilization of Hydrocarbon Reservoirs" which is the course least related to Chemical Engineering. However, given that the modified curriculum will be applicable to students enrolling in September 2023, the specific change will be implemented after 2 years (the inclusion of more sustainability related content will be applied immediately though). The revised course descriptions of both CEN 305 and CEN 321 are also provided in Annex I.

d) Regarding process and lab safety issues, such topics are always covered during the introductory lecture in every laboratory course. Based on the comment of the committee, the specific topic has been now included in the introductory course CEN 100 "Professional Skills for Chemical Engineers" of the first semester (see Annex I for the revised description).

e) Aiming to add further computational courses, we need to remove courses already included in the curriculum. As discussed during the meeting, the objective here is to remove non-essential Engineering courses such as CEN 213 "Engineering Mechanics" and CEN 306 "Electrical Circuits" and replace them with new computational courses. Given that both courses that should be removed comprise a suggestion, since the establishment of the Chemical Engineering programme of CUT, by the Cyprus Scientific and Technical Chamber (CSTC), prior their removal from the curriculum the specific change should be first confirmed with CSTC. However, we have enriched in the meantime

the description of CEN 301 "Dynamic Simulation with the Use of Computers" (see Annex I for the revised description).

Areas of improvement and recommendations for PhD

Q4) Consider enhancing the involvement of subject experts from recognized research environments in the evaluation committee for theses.

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AN4) According to the University's regulations, external members of the PhD dissertation Examination Committee must possess expertise relevant to the subject of the dissertation and comply with specified regulations. Additionally, it is essential to avoid any conflict of interest between the student and external evaluators. Therefore, each member of the Examination Committee, apart from the Research Advisor, is required to submit a statement declaring any potential conflict of interest. The composition of the examination committee, including a declaration of the relevance of the research expertise of each member to the topic of the PhD Thesis, is approved first by the Departmental Board followed by the Faculty Board. To ensure that the members of the Examination Committee are indeed experts in the topic of the PhD Thesis, the research advisor should document their qualifications and expertise. This documentation should be presented in a comprehensive manner to the Departmental Board, providing detailed information about the external members' backgrounds and areas of specialization. According to University's regulations, at least one external examiner (coming from a different University or Institution) should be included in the external committee, while the additional examiner of the committee could be either an internal or external faculty member. Thus, although University regulations already require the involvement of external subject experts in the PhD Examination Committee, the Department will further promote the inclusion of experts from recognized research environments to enhance the quality of the programme.

Q5) Offer optional short courses in research methods, programming, career planning, project management, and other relevant areas to all PhD students, tailoring recommendations to individual students' needs.

Actions Taken by the Institution

AN5) The Department of Chemical Engineering (DCE) has implemented several strategies and will implement even more if necessary to enhance the learning experiences of its PhD students. The following points outline the initiatives and resources offered by the Department:

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The seminars include academic lectures by external researchers or professors, presentations on statistical packages and professional skills training. Moreover, neither the teaching and research staff nor the PhD students are required to pay additional tuition fees to participate in the seminars.

c) The LDN of CUT organizes a Summer School every year for doctoral students from the 8 Universities participating in the alliance of the European University of Technology (EUt+). The Summer School program includes lectures, discussions, exercises and networking activities delivered in English. The Summer School aims to introduce students to their new role as PhD candidates and provide them with tools to manage projects, research education, work/life balance and collaboration with supervisors. The first-year PhD students of DCE will be encouraged to attend this course.

d) Through research-funded projects, workshops or training schools are organized by faculty members of the Department, providing opportunities for PhD students to attend. For example, the specialized training school "Ecofriendly multipurpose Biobased Products from municipal biowaste" was organized by LIFE EBP (a LIFE+ project focused on the valorization of the organic fraction of municipal solid waste for fertilizer production in agricultural applications https://www.lifeebp.eu/resources/posts/8/Leaflet%20EBP%20A5.pdf) between 13-14 October 2022 in Limassol at the premises of CUT. Moreover, the "An ocean of opportunities" hybrid training school on bridging the gap between applied sciences and commercialization potential with an in-depth workshop on communication and pitching the idea was organized at the premises of CUT, the Cyprus Marine Aquaculture Research Center of the DFMR and the Cyprus Marine and Maritime Institute between 2-6 May 2022. The training school was supported by the COST Action Ocean4Biotech (CA18238), the Junior Achievements Cyprus, the European University of Technology and the XPRO Consulting Limited, Cyprus (see also https://www.cmmi.blue/an-ocean-of-opportunities-hybrid-training-school/).

Student – centred learning, teaching and assessment

(ESG 1.3)

Areas of improvement and recommendations for BSc

Process of teaching and learning and student-centered teaching methodology

Q1) The process of teaching and learning should support students' individual and social development, including the development of national and European identity, social responsibility and active citizenship initiatives for chemical communities/industrial areas of Cyprus. The Head of department could follow the 4 purposes of higher education of the Council of Europe.

Actions Taken by the Institution

AN1) The 4 major purposes for higher education as identified by the Council of Europe are as follows: a) preparation for the labor market, b) preparation for life as active citizens in democratic societies, c) personal development and d) development of a broad and advanced knowledge base. Some of these are actually dealt with at university level, by one of the support groups of LDN (htttp://ldn.cut.ac.cy/el/) in CUT, that offers academic learning support and aims at developing the study and learning skills of students, including doctoral students and researchers, by offering training programmes in teaching and research skills, as well as in skills of writing research proposals.

LDN offers a series of integrated courses (seminars) on topics related to strengthening the knowledge and skills of both postgraduate and doctoral students. A few online seminars delivered over the past 2 years include the following topics: "Doctoral deadlines and selfcare" (this seminar referred to doctoral students and more specifically to the management of challenges arising from PhD studies), "Open discussion on accessibility and inclusion" (Roundtable discussion on issues of accessibility and inclusion in everyday life, student and professional life, virtual and face-to-face), and "Starting my own business: what should I know?" (the aim of the seminar was to explain basic concepts that should be known by students interested in starting their own business).

At departmental level, students also get acquainted with chemical, and other, industries through seminars given as part of courses CEN 407 "Studies and Career Interconnection Seminars I" and CEN 408 "Studies and Career Interconnection Seminars II".

Practical training

Q2) The duration of practical training of students, following discussion with them, could be possibly extended. The University could expand the list of the collaborating industries and companies that accept students for practical training and include also all the working environments in which Chemical Engineers could work in the future (public, private, remote). That would benefit both the students and also the public awareness about the department and the role of Chemical Engineering in society and in the local economy.

Actions Taken by the Institution

AN2) Although it would be desirable to extend the practical training, this is unfortunately difficult to achieve. Practical training starts upon completion of the examination period of the spring semester in early June and it should last between 4-6 weeks. If both the company and the student wish, the duration could be further extended until the end of August prior commencement of the next semester at the beginning of September. However, many companies in Cyprus substantially reduce their activity for approximately 2 weeks in August due to the vacation taken by their staff. This fact restricts

extending the duration of practical training for all students, given that it will be extremely difficult to secure the number of extended placements required to cover all students due to the aforementioned particularity.

DCE frequently updates the list of companies accepting students for practical training and, given that the programme has been active for only 6 years, the current list is increasing every year. Moreover, we would like to thank the committee for the recommendation to add organizations for practical training from the public sector. It should be noted that DCE already has students conducting their practical training in public authorities, such as the Sewerage Board of Limassol-Amathus and Larnaca Sewerage Board. Moreover, DCE has established a preliminary agreement to appoint students to the Cyprus Hydrocarbons Company (CHC), which is the National (State owned) Oil and Gas Company of Cyprus, and the Cyprus Organisation for Standardisation (CYS), which is the national standardisation body of Cyprus.

Areas of improvement and recommendations for PhD

Process of teaching and learning and student-centered teaching methodology

Q3) It would be a benefit for students to be able to take some ECTS-course credits, instead of having to rely on colleagues to learn necessary things, such as the use of MATLAB or similar.

Students are encouraged to take a more active role in creating the learning and research process and in being the future active citizens. Particularly PhD students in collaboration with administration and research officers shall be leaders in making CUT a young leader in Public Learning organizations (e.g. provide classes or mentoring for Chemeng students and public departments though CUT E--learning platform). We also suggest they be involved in making CUT a Research leader within public organizations.

Actions Taken by the Institution

AN3) PhD candidates have the option to enroll and earn credits in two undergraduate courses, as recommended by the Departmental Postgraduate Committee. If they do not possess a Master's degree, they should attend at least eight courses (up to two undergraduate and at least six postgraduate). Currently, students with a Master's degree are not required to take additional university courses, as they are credited with 60 ECTS. However, we acknowledge that there may be instances where PhD students, even those with a Master's degree, may need to acquire new knowledge or skills in order to effectively pursue their research. In these cases, students may, if they wish to, enroll to courses.
PhD students can additionally participate in the seminars offered by the LDN of CUT. Moreover, PhD candidates are obliged to participate in at least one taught laboratory course as Teaching Assistants. However, although DCE commits students for one laboratory course, the vast majority of students participate as Teaching Assistants in several courses.

Q4) The department could discuss ways for increasing the University Ranking through Research programs. First, there could be a better dissemination of ChemEng Research results of European Programs both internally with other departments of CUT and externally with other public Universities in order to make gradually an ecosystem of E-Universities in the Republic of Cyprus.

Actions Taken by the Institution

AN4) To address these suggestions, DCE plans to take the following actions:

a) Empowering PhD Students: DCE recognizes the importance of students taking an active role in shaping their learning experience and becoming future active citizens. The Department will actively collaborate with administration and research officers to provide opportunities for PhD students to lead initiatives, such as offering classes or mentoring programmes for undergraduate Chemical Engineering students and public departments through CUT's E-learning platform. This direction will not only enhance the learning experience, but also contribute to the development of leadership skills among the PhD students involved.
b) Establishing Research Leadership: Building upon the strengths of the Department's research programmes, DCE will work towards increasing the University Ranking through impactful research initiatives. Improved dissemination of Chemical Engineering research results obtained via European programmes will be prioritized, both internally within other Departments of CUT and externally with other public universities. Published papers and dissemination activities from research programmes will be communicated through departmental and university social media platforms.

2. Teaching staff
(ESG 1.5)

Areas of improvement and recommendations for BSc

Q1) Employment of more core-chemical-engineering faculty.

Actions Taken by the Institution

AN1) DCE agrees with the committee that it is essential to employ more faculty members with a first degree in Chemical Engineering. The specific requirement is part of the Strategic Plan of DCE. Towards this direction, DCE expects that two (2) more faculty members will be added in early 2024 and three (3) more by the end of 2025 based on running and planned hiring procedures.

Areas of improvement and recommendations for PhD

Q2) There are not many problems detected during this virtual visit, regarding the teaching staff of PhD programs. We do believe it would be helpful for students, enrolling with an MSc as their basis, to be able to take university courses. Presently students enrolled with an MSc degree are not supposed to do that. However, there can be a need for courses – even at PhD level – when trying to learn something new.

Actions Taken by the Institution

AN2) We would like to thank the committee for the observation that not many problems were detected during the virtual visit regarding the teaching staff in our PhD programme. DCE understands the importance of providing flexibility and opportunities for students holding a Master's degree to further enhance their knowledge and skills through university courses. As mentioned above, PhD candidates have the option to enroll and earn credits in two undergraduate courses, as recommended by the Departmental Postgraduate Committee. If they do not possess a Master's degree, they should attend at least eight courses (up to two undergraduate and at least six postgraduate). PhD students can additionally participate in the seminars offered by the LDN of CUT. Currently, students with a Master's degree are not required to take additional university courses, as they are credited with 60 ECTS. However, we acknowledge that there could be instances where PhD students, even those with a Master's degree, may need to acquire new knowledge or skills in order to effectively pursue their research.

The decision to credit 60 ECTS for students with a Master's degree is determined by the Postgraduate Studies Committee, followed by the approval of the Departmental Board. However, if a supervisor determines that a PhD student lacks the necessary background or expertise in a particular area, they have the option to propose that the student should take one or more courses to support the student. DCE strives to maintain a balance between providing students with the flexibility to pursue their research interests and ensuring they have the necessary skills and knowledge to succeed in their PhD studies. The consideration of additional courses for individual students constitutes a collaborative decision-making process between the student, their supervisor, and the relevant departmental committees.

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

Areas of improvement and recommendations for BSc

Q1) Consider streamlining a process to address cases where students may face difficulty in passing compulsory courses, such as issuing alternative awards (e.g., certificates or diplomas) with lesser requirements.

Actions Taken by the Institution

AN1) Unfortunately, alternative awards cannot be issued based on University regulations. To the best of our knowledge, public universities in Cyprus cannot issue alternative awards to accommodate cases where students face difficulty in passing specific compulsory courses.

Areas of improvement and recommendations for PhD

No specific areas of improvement identified.

4. Learning resources and student support
(ESG 1.6)

Areas of improvement and recommendations for BSc
Q1) A more integrated campus would be desirable.

Actions Taken by the Institution
AN1) DCE fully agrees that a more integrated campus would be desirable. To address this issue, the Department actively communicates and expresses its needs for a more integrated campus to the authorities of the University through the Dean of the faculty, where DCE highlights the benefits of creating spaces and initiatives that facilitate interdisciplinary interactions, shared resources and collaborative opportunities among different departments and disciplines.

Based on the University's Strategic Plan DCE is expected to move to a new building in Veregaria area situated outside the city center of Limassol. However, the specific plan requires several years to materialize and until then DCE will be confined within the dispersed premises currently available in the main campus of CUT in the center of Limassol.

Areas of improvement and recommendations for PhD
Q2) A more integrated campus would be desirable.

Actions Taken by the Institution
AN2) Please see our response in AN1 above.

5. Additional for doctoral programmes
(ALL ESG)

Areas of improvement and recommendations
Q1) The final assessment of PhD thesis may enhance the involvement of subject experts from recognized external research environments.

Actions Taken by the Institution
AN1) According to the University's regulations, external members of the PhD dissertation Examination Committee must possess expertise relevant to the subject of the dissertation. Additionally, it is essential to avoid any conflict of interest between the student and external evaluators. Therefore, each member of the Examination Committee, apart from the Research Advisor, is required to submit a statement declaring any potential conflict of interest. The composition of the examination committee, including a declaration of the relevance of the research expertise of each member to the topic of the PhD Thesis, is approved first by the Departmental Board followed by the Faculty Board. To ensure that the members of the Examination Committee are indeed experts in the topic of the PhD Thesis, the research advisor should document their qualifications and expertise. This documentation should be presented in a comprehensive manner to the Departmental Board, providing detailed information about the external members' backgrounds and areas of specialization.
Thus, although University regulations already require the involvement of external subject experts in the PhD Examination Committee, the Department will further promote the inclusion of experts from recognized research environments to enhance the quality of the programme.

7. Eligibility (Joint programme)

(ALL ESG)

N/A

Areas of improvement and recommendations **by EEC**	Actions Taken by the Institution	For Official Use ONLY
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Click or tap here to enter text.	Click or tap here to enter text.	Choose level of compliance:

B. Conclusions and final remarks

Recommendations:

• Q1) Recruitment of more faculty with core-chemical-engineering competences
• Q2) Better integration of facilities within the same (or closely situated) buildings
• Q3) There seems not to be much consciousness among students about representation and how to exert influence on programs, this makes the students an under-utilized resource in the development of the programs
• Q4) Somewhat more emphasis on practical operation of chemical engineering processing systems at intermediate to larger scale
• Q5) Develop access to practical experiences with larger scale processing equipment. Internships may help with this, but then internships must not reduce to analytical work only

Actions Taken by the Institution

• AN1) DCE anticipates that two (2) more faculty members will be recruited in early 2024 and three (3) more by the end of 2025.
• AN2) DCE is expected to move to a new building in Veregaria area (outside the city center of Limassol) as specified in the Strategic Plan of CUT.
• AN3) Students can bring up issues through the three (3) student representatives in the Departmental Board. Subsequently, the Departmental Undergraduate Studies Committee, which oversees handling of various tasks related to Undergraduate studies and the curriculum, is responsible to either directly resolve the issues raised by students or to inform the Departmental Board aiming to seek for optimal solutions.
• AN4+5) Currently students participate in one (1) laboratory practical experience at the IESC Innovating Environmental Solutions Center Ltd (http://www.iesc-ltd.com/) which is located in Ypsonas in Limassol as part of the laboratory exercises which are included in the course CEN 302 “Chemical Technology Laboratory”. DCE will supplement the specific course with an additional laboratory exercise that will be conducted at a relevant industry. A very small number of Internships covering analytical work only will be eliminated.

C. Higher Education Institution academic representatives

Name	*Position*	*Signature*
Michalis Koutinas	Department Chair	
Alexandros Charalambides	Program Coordinator	
Ioannis Vyrides	Postgraduate Studies Committee	
Pavlos Stefanou	Undergraduate Studies Committee	Παύλος Στεφάνου
Achilleas Konstantinou	Undergraduate Studies Committee	Αχιλλέας Κωνσταντίνου
Click to enter Name	Click to enter Position	

Date: 10/8/2023

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e-mail: info@dipae.ac.cy

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)**

Programme 1 – BSc

In Greek:

Προπτυχιακό Πρόγραμμα στη Χημική Μηχανική (4 έτη, 240 ECTS)

In English:

Undergraduate Programme in Chemical Engineering (4 years, 240 ECTS

Language(s) of instruction: Greek

Programme 2 – PhD[Title 2]

In Greek:

Διδακτορικό Πρόγραμμα στη Χημική Μηχανική και Περιβαλλοντική Τεχνολογία (3 έτη, 240 ECTS)

In English:

PhD Programme in Chemical Engineering and Environmental Technology (3 years, 240 ECTS)

Language(s) of instruction: Greek

- **Programme's status:** Choose Status
- **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 300.1.1/1 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. The answers' documentation should be brief and accurate and supported by the relevant documentation. Referral to annexes should be made only when necessary.*

- *In particular, under each assessment area and by using the 2nd column of each table, the HEI must respond on the following:*

  - *the areas of improvement and recommendations of the EEC*
  - *the conclusions and final remarks noted by the EEC*

- *The institution should respond to the EEC comments, in the designated area next each comment. The comments of the EEC should be copied from the EEC report **without any interference** in the content.*

- *In case of annexes, those should be attached and sent on separate document(s). Each document should be in *.pdf format and named as annex1, annex2, etc.*

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

Areas of improvement and recommendations for BSc

Q1) Enhance the involvement of external stakeholders, including employers, industrial practitioners, and subject experts from other institutions, especially those in recognized research environments.

Actions Taken by the Institution

AN1) Such involvement of external stakeholders has already been done to a certain extent. For example, we have stated that several laboratory exercises are conducted or are planned to be conducted at different industries where employees provide their knowledge to the students. Specifically, the students of CEN 302 "Chemical Technology Laboratory" conduct a lab exercise at the Innovating Environmental Solutions Center (IESC Ltd) located in Limassol. The Department aims to further strengthen the programme by providing an additional lab exercise of CEN 302 at the premises of a relevant industry. Moreover, the practical training course (CEN 309) takes place in the industry, while the Department organizes several events (e.g. invited talks from the industry and public sector, workshops, practical training courses/sessions) with the participation of various stakeholders. These actions will be further extended over the next few years.

Q2) Increase the frequency of course and program reviews, considering an annual or biennial cycle to ensure ongoing improvement. Given the program's relative newness, the recent completion of a program review cycle is unclear.

Actions Taken by the Institution

AN2) The program is revised constantly by the Departmental Undergraduate Studies Committee (USC). The specific committee is responsible for constantly monitoring the programme, taking action to propose solutions when problems arise as well as to inform the Departmental Board about cases that cannot be independently solved by USC. An annual review of the programme will be targeted, between the USC and student representatives.

Q3) Conduct a top-down review of the program to course level to address repetitions, and include topics such as computer applications, programming, artificial intelligence and machine learning, engineering thermodynamics, sustainability and ethics, process safety, group design, and teamwork throughout the curriculum.

Actions Taken by the Institution

AN3) a) We have conducted a complete review of the curriculum and we have indeed identified a few cases of repetition. An important case is the introduction of students to mass and energy balances in CEN 111 "Introduction to Chemical Engineering", which are also taught in more detail during CEN 206 "Mass and Energy Balance". However, it should be noted that the introduction in CEN 111 constitutes only an introductory course, which is needed to cover the rest of the material. Thus, the description of the specific course has been modified aiming to clarify that the teaching of

mass and energy balances in CEN 111 consists only introductory material. Moreover, in CEN 204 "Applied Thermodynamics I" students are taught chemical kinetics, which is additionally taught in CEN 210 "Chemical Reaction Engineering". Since chemical kinetics, as pointed out by the EEC, is not relevant content to a thermodynamics course, we have removed the specific material from the description of CEN 204 and thermodynamics content has been added instead. The revised course descriptions are provided in Annex 1.

b) Aiming to introduce students to Aspen Hysys simulations prior teaching of CEN 311, based on a point raised by the EEC during the meeting with the teaching staff on May 26th 2023, a few simple simulations in the Unit operations courses (CEN 209 "Unit Operations I" and CEN 327 "Unit Operations II") as well as CEN 307 "Chemical Reactor Design and Installation" will be included. For example, during an additional tutorial of CEN 209 students could be instructed on the use of simple modules of Hysys and perform the simulation of a pump and a heat exchanger operation to meet specific conditions (e.g. calculation of the cold fluid flow rate to reach a prespecified exit temperature of the hot fluid). Similarly, during CEN 327 students could simulate the distillation process of a multi-component mixture and of an adsorption column, while in CEN 307 the non-isothermal operation of chemical reactors (which usually cannot be solved analytically) could be simulated. In the same courses (CEN 209, CEN 307 and CEN 327), it has been clarified that the project given to students is computational using Matlab and performed in groups. The revised descriptions of the aforementioned courses are also provided in Annex I.

c) The content of CEN 305 has been almost completely revised to introduce additional engineering thermodynamics material. We have also decided to convert the Environmental Chemical Engineering Specialization module CEN 321 "Wastewater and Liquid Waste Treatment Technologies" into a core module given its high importance to Chemical Engineers. Furthermore, the content of the course has been modified to cover more sustainability issues as per the Committee's suggestion. The revised description is available in Annex 1. Based on this change, one module from the Petrochemical Engineering Specialization should be removed. We have selected CEN 329 "Detection and Utilization of Hydrocarbon Reservoirs" which is the course least related to Chemical Engineering. However, given that the modified curriculum will be applicable to students enrolling in September 2023, the specific change will be implemented after 2 years (the inclusion of more sustainability related content will be applied immediately though). The revised course descriptions of both CEN 305 and CEN 321 are also provided in Annex I.

d) Regarding process and lab safety issues, such topics are always covered during the introductory lecture in every laboratory course. Based on the comment of the committee, the specific topic has been now included in the introductory course CEN 100 "Professional Skills for Chemical Engineers" of the first semester (see Annex I for the revised description).

e) Aiming to add further computational courses, we need to remove courses already included in the curriculum. As discussed during the meeting, the objective here is to remove non-essential Engineering courses such as CEN 213 "Engineering Mechanics" and CEN 306 "Electrical Circuits" and replace them with new computational courses. Given that both courses that should be removed comprise a suggestion, since the establishment of the Chemical Engineering programme of CUT, by the Cyprus Scientific and Technical Chamber (CSTC), prior their removal from the curriculum the specific change should be first confirmed with CSTC. However, we have enriched in the meantime

the description of CEN 301 "Dynamic Simulation with the Use of Computers" (see Annex I for the revised description).

Areas of improvement and recommendations for PhD

Q4) Consider enhancing the involvement of subject experts from recognized research environments in the evaluation committee for theses.

Actions Taken by the Institution

AN4) According to the University's regulations, external members of the PhD dissertation Examination Committee must possess expertise relevant to the subject of the dissertation and comply with specified regulations. Additionally, it is essential to avoid any conflict of interest between the student and external evaluators. Therefore, each member of the Examination Committee, apart from the Research Advisor, is required to submit a statement declaring any potential conflict of interest. The composition of the examination committee, including a declaration of the relevance of the research expertise of each member to the topic of the PhD Thesis, is approved first by the Departmental Board followed by the Faculty Board. To ensure that the members of the Examination Committee are indeed experts in the topic of the PhD Thesis, the research advisor should document their qualifications and expertise. This documentation should be presented in a comprehensive manner to the Departmental Board, providing detailed information about the external members' backgrounds and areas of specialization. According to University's regulations, at least one external examiner (coming from a different University or Institution) should be included in the external committee, while the additional examiner of the committee could be either an internal or external faculty member. Thus, although University regulations already require the involvement of external subject experts in the PhD Examination Committee, the Department will further promote the inclusion of experts from recognized research environments to enhance the quality of the programme.

Q5) Offer optional short courses in research methods, programming, career planning, project management, and other relevant areas to all PhD students, tailoring recommendations to individual students' needs.

Actions Taken by the Institution

AN5) The Department of Chemical Engineering (DCE) has implemented several strategies and will implement even more if necessary to enhance the learning experiences of its PhD students. The following points outline the initiatives and resources offered by the Department:

a) Through the Learning Development Network (LDN) of Cyprus University of Technology (CUT), PhD students can participate in several courses offered. LDN aims to design and implement seminars and workshops based on innovative teaching practices, promote the exchange of good teaching practices, contribute to the long-term educational policy of the University, provide continuous support for academic practice, and coordinate and operate new, creative learning spaces at the University (https://ldn.cut.ac.cy/). DCE should specify the minimum number of courses offered by LDN that PhD students should attend per year.
b) The Department organizes a mandatory seminar series that PhD students are required to attend. These seminars aim to equip students with essential knowledge relevant to their research area.

The seminars include academic lectures by external researchers or professors, presentations on statistical packages and professional skills training. Moreover, neither the teaching and research staff nor the PhD students are required to pay additional tuition fees to participate in the seminars.

c) The LDN of CUT organizes a Summer School every year for doctoral students from the 8 Universities participating in the alliance of the European University of Technology (EUt+). The Summer School program includes lectures, discussions, exercises and networking activities delivered in English. The Summer School aims to introduce students to their new role as PhD candidates and provide them with tools to manage projects, research education, work/life balance and collaboration with supervisors. The first-year PhD students of DCE will be encouraged to attend this course.

d) Through research-funded projects, workshops or training schools are organized by faculty members of the Department, providing opportunities for PhD students to attend. For example, the specialized training school "Ecofriendly multipurpose Biobased Products from municipal biowaste" was organized by LIFE EBP (a LIFE+ project focused on the valorization of the organic fraction of municipal solid waste for fertilizer production in agricultural applications https://www.lifeebp.eu/resources/posts/8/Leaflet%20EBP%20A5.pdf) between 13-14 October 2022 in Limassol at the premises of CUT. Moreover, the "An ocean of opportunities" hybrid training school on bridging the gap between applied sciences and commercialization potential with an in-depth workshop on communication and pitching the idea was organized at the premises of CUT, the Cyprus Marine Aquaculture Research Center of the DFMR and the Cyprus Marine and Maritime Institute between 2-6 May 2022. The training school was supported by the COST Action Ocean4Biotech (CA18238), the Junior Achievements Cyprus, the European University of Technology and the XPRO Consulting Limited, Cyprus (see also https://www.cmmi.blue/an-ocean-of-opportunities-hybrid-training-school/).

Student – centred learning, teaching and assessment

(ESG 1.3)

Areas of improvement and recommendations for BSc

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Q1) The process of teaching and learning should support students' individual and social development, including the development of national and European identity, social responsibility and active citizenship initiatives for chemical communities/industrial areas of Cyprus. The Head of department could follow the 4 purposes of higher education of the Council of Europe.

Actions Taken by the Institution

AN1) The 4 major purposes for higher education as identified by the Council of Europe are as follows: a) preparation for the labor market, b) preparation for life as active citizens in democratic societies, c) personal development and d) development of a broad and advanced knowledge base. Some of these are actually dealt with at university level, by one of the support groups of LDN (htttp://ldn.cut.ac.cy/el/) in CUT, that offers academic learning support and aims at developing the study and learning skills of students, including doctoral students and researchers, by offering training programmes in teaching and research skills, as well as in skills of writing research proposals.

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At departmental level, students also get acquainted with chemical, and other, industries through seminars given as part of courses CEN 407 "Studies and Career Interconnection Seminars I" and CEN 408 "Studies and Career Interconnection Seminars II".

Practical training

Q2) The duration of practical training of students, following discussion with them, could be possibly extended. The University could expand the list of the collaborating industries and companies that accept students for practical training and include also all the working environments in which Chemical Engineers could work in the future (public, private, remote). That would benefit both the students and also the public awareness about the department and the role of Chemical Engineering in society and in the local economy.

Actions Taken by the Institution

AN2) Although it would be desirable to extend the practical training, this is unfortunately difficult to achieve. Practical training starts upon completion of the examination period of the spring semester in early June and it should last between 4-6 weeks. If both the company and the student wish, the duration could be further extended until the end of August prior commencement of the next semester at the beginning of September. However, many companies in Cyprus substantially reduce their activity for approximately 2 weeks in August due to the vacation taken by their staff. This fact restricts

extending the duration of practical training for all students, given that it will be extremely difficult to secure the number of extended placements required to cover all students due to the aforementioned particularity.

DCE frequently updates the list of companies accepting students for practical training and, given that the programme has been active for only 6 years, the current list is increasing every year. Moreover, we would like to thank the committee for the recommendation to add organizations for practical training from the public sector. It should be noted that DCE already has students conducting their practical training in public authorities, such as the Sewerage Board of Limassol-Amathus and Larnaca Sewerage Board. Moreover, DCE has established a preliminary agreement to appoint students to the Cyprus Hydrocarbons Company (CHC), which is the National (State owned) Oil and Gas Company of Cyprus, and the Cyprus Organisation for Standardisation (CYS), which is the national standardisation body of Cyprus.

Areas of improvement and recommendations for PhD

Process of teaching and learning and student-centered teaching methodology

Q3) It would be a benefit for students to be able to take some ECTS-course credits, instead of having to rely on colleagues to learn necessary things, such as the use of MATLAB or similar.

Students are encouraged to take a more active role in creating the learning and research process and in being the future active citizens. Particularly PhD students in collaboration with administration and research officers shall be leaders in making CUT a young leader in Public Learning organizations (e.g. provide classes or mentoring for Chemeng students and public departments though CUT E--learning platform). We also suggest they be involved in making CUT a Research leader within public organizations.

Actions Taken by the Institution

AN3) PhD candidates have the option to enroll and earn credits in two undergraduate courses, as recommended by the Departmental Postgraduate Committee. If they do not possess a Master's degree, they should attend at least eight courses (up to two undergraduate and at least six postgraduate). Currently, students with a Master's degree are not required to take additional university courses, as they are credited with 60 ECTS. However, we acknowledge that there may be instances where PhD students, even those with a Master's degree, may need to acquire new knowledge or skills in order to effectively pursue their research. In these cases, students may, if they wish to, enroll to courses.
PhD students can additionally participate in the seminars offered by the LDN of CUT. Moreover, PhD candidates are obliged to participate in at least one taught laboratory course as Teaching Assistants. However, although DCE commits students for one laboratory course, the vast majority of students participate as Teaching Assistants in several courses.

Q4) The department could discuss ways for increasing the University Ranking through Research programs. First, there could be a better dissemination of ChemEng Research results of European Programs both internally with other departments of CUT and externally with other public Universities in order to make gradually an ecosystem of E-Universities in the Republic of Cyprus.

Actions Taken by the Institution

AN4) To address these suggestions, DCE plans to take the following actions:

a) Empowering PhD Students: DCE recognizes the importance of students taking an active role in shaping their learning experience and becoming future active citizens. The Department will actively collaborate with administration and research officers to provide opportunities for PhD students to lead initiatives, such as offering classes or mentoring programmes for undergraduate Chemical Engineering students and public departments through CUT's E-learning platform. This direction will not only enhance the learning experience, but also contribute to the development of leadership skills among the PhD students involved.
b) Establishing Research Leadership: Building upon the strengths of the Department's research programmes, DCE will work towards increasing the University Ranking through impactful research initiatives. Improved dissemination of Chemical Engineering research results obtained via European programmes will be prioritized, both internally within other Departments of CUT and externally with other public universities. Published papers and dissemination activities from research programmes will be communicated through departmental and university social media platforms.

2. Teaching staff
(ESG 1.5)

Areas of improvement and recommendations for BSc

Q1) Employment of more core-chemical-engineering faculty.

Actions Taken by the Institution

AN1) DCE agrees with the committee that it is essential to employ more faculty members with a first degree in Chemical Engineering. The specific requirement is part of the Strategic Plan of DCE. Towards this direction, DCE expects that two (2) more faculty members will be added in early 2024 and three (3) more by the end of 2025 based on running and planned hiring procedures.

Areas of improvement and recommendations for PhD

Q2) There are not many problems detected during this virtual visit, regarding the teaching staff of PhD programs. We do believe it would be helpful for students, enrolling with an MSc as their basis, to be able to take university courses. Presently students enrolled with an MSc degree are not supposed to do that. However, there can be a need for courses – even at PhD level – when trying to learn something new.

Actions Taken by the Institution

AN2) We would like to thank the committee for the observation that not many problems were detected during the virtual visit regarding the teaching staff in our PhD programme. DCE understands the importance of providing flexibility and opportunities for students holding a Master's degree to further enhance their knowledge and skills through university courses. As mentioned above, PhD candidates have the option to enroll and earn credits in two undergraduate courses, as recommended by the Departmental Postgraduate Committee. If they do not possess a Master's degree, they should attend at least eight courses (up to two undergraduate and at least six postgraduate). PhD students can additionally participate in the seminars offered by the LDN of CUT. Currently, students with a Master's degree are not required to take additional university courses, as they are credited with 60 ECTS. However, we acknowledge that there could be instances where PhD students, even those with a Master's degree, may need to acquire new knowledge or skills in order to effectively pursue their research.

The decision to credit 60 ECTS for students with a Master's degree is determined by the Postgraduate Studies Committee, followed by the approval of the Departmental Board. However, if a supervisor determines that a PhD student lacks the necessary background or expertise in a particular area, they have the option to propose that the student should take one or more courses to support the student. DCE strives to maintain a balance between providing students with the flexibility to pursue their research interests and ensuring they have the necessary skills and knowledge to succeed in their PhD studies. The consideration of additional courses for individual students constitutes a collaborative decision-making process between the student, their supervisor, and the relevant departmental committees.

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

Areas of improvement and recommendations for BSc

Q1) Consider streamlining a process to address cases where students may face difficulty in passing compulsory courses, such as issuing alternative awards (e.g., certificates or diplomas) with lesser requirements.

Actions Taken by the Institution

AN1) Unfortunately, alternative awards cannot be issued based on University regulations. To the best of our knowledge, public universities in Cyprus cannot issue alternative awards to accommodate cases where students face difficulty in passing specific compulsory courses.

Areas of improvement and recommendations for PhD

No specific areas of improvement identified.

4. Learning resources and student support
(ESG 1.6)

Areas of improvement and recommendations for BSc
Q1) A more integrated campus would be desirable.

Actions Taken by the Institution
AN1) DCE fully agrees that a more integrated campus would be desirable. To address this issue, the Department actively communicates and expresses its needs for a more integrated campus to the authorities of the University through the Dean of the faculty, where DCE highlights the benefits of creating spaces and initiatives that facilitate interdisciplinary interactions, shared resources and collaborative opportunities among different departments and disciplines.

Based on the University's Strategic Plan DCE is expected to move to a new building in Veregaria area situated outside the city center of Limassol. However, the specific plan requires several years to materialize and until then DCE will be confined within the dispersed premises currently available in the main campus of CUT in the center of Limassol.

Areas of improvement and recommendations for PhD
Q2) A more integrated campus would be desirable.

Actions Taken by the Institution
AN2) Please see our response in AN1 above.

5. Additional for doctoral programmes
(ALL ESG)

Areas of improvement and recommendations
Q1) The final assessment of PhD thesis may enhance the involvement of subject experts from recognized external research environments.

Actions Taken by the Institution
AN1) According to the University's regulations, external members of the PhD dissertation Examination Committee must possess expertise relevant to the subject of the dissertation. Additionally, it is essential to avoid any conflict of interest between the student and external evaluators. Therefore, each member of the Examination Committee, apart from the Research Advisor, is required to submit a statement declaring any potential conflict of interest. The composition of the examination committee, including a declaration of the relevance of the research expertise of each member to the topic of the PhD Thesis, is approved first by the Departmental Board followed by the Faculty Board. To ensure that the members of the Examination Committee are indeed experts in the topic of the PhD Thesis, the research advisor should document their qualifications and expertise. This documentation should be presented in a comprehensive manner to the Departmental Board, providing detailed information about the external members' backgrounds and areas of specialization.
Thus, although University regulations already require the involvement of external subject experts in the PhD Examination Committee, the Department will further promote the inclusion of experts from recognized research environments to enhance the quality of the programme.

7. Eligibility (Joint programme)

(ALL ESG)

N/A

Areas of improvement and recommendations **by EEC**	Actions Taken by the Institution	For Official Use ONLY
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Click or tap here to enter text.	Click or tap here to enter text.	Choose level of compliance:

B. Conclusions and final remarks

Recommendations:

• Q1) Recruitment of more faculty with core-chemical-engineering competences
• Q2) Better integration of facilities within the same (or closely situated) buildings
• Q3) There seems not to be much consciousness among students about representation and how to exert influence on programs, this makes the students an under-utilized resource in the development of the programs
• Q4) Somewhat more emphasis on practical operation of chemical engineering processing systems at intermediate to larger scale
• Q5) Develop access to practical experiences with larger scale processing equipment. Internships may help with this, but then internships must not reduce to analytical work only

Actions Taken by the Institution

• AN1) DCE anticipates that two (2) more faculty members will be recruited in early 2024 and three (3) more by the end of 2025.
• AN2) DCE is expected to move to a new building in Veregaria area (outside the city center of Limassol) as specified in the Strategic Plan of CUT.
• AN3) Students can bring up issues through the three (3) student representatives in the Departmental Board. Subsequently, the Departmental Undergraduate Studies Committee, which oversees handling of various tasks related to Undergraduate studies and the curriculum, is responsible to either directly resolve the issues raised by students or to inform the Departmental Board aiming to seek for optimal solutions.
• AN4+5) Currently students participate in one (1) laboratory practical experience at the IESC Innovating Environmental Solutions Center Ltd (http://www.iesc-ltd.com/) which is located in Ypsonas in Limassol as part of the laboratory exercises which are included in the course CEN 302 “Chemical Technology Laboratory”. DCE will supplement the specific course with an additional laboratory exercise that will be conducted at a relevant industry. A very small number of Internships covering analytical work only will be eliminated.

C. Higher Education Institution academic representatives

Name	*Position*	*Signature*
Michalis Koutinas	Department Chair	
Alexandros Charalambides	Program Coordinator	
Ioannis Vyrides	Postgraduate Studies Committee	
Pavlos Stefanou	Undergraduate Studies Committee	Παύλος Στεφάνου
Achilleas Konstantinou	Undergraduate Studies Committee	Αχιλλέας Κωνσταντίνου
Click to enter Name	Click to enter Position	

Date: 10/8/2023

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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)**

Programme 1 – BSc

In Greek:

Προπτυχιακό Πρόγραμμα στη Χημική Μηχανική (4 έτη, 240 ECTS)

In English:

Undergraduate Programme in Chemical Engineering (4 years, 240 ECTS

Language(s) of instruction: Greek

Programme 2 – PhD[Title 2]

In Greek:

Διδακτορικό Πρόγραμμα στη Χημική Μηχανική και Περιβαλλοντική Τεχνολογία (3 έτη, 240 ECTS)

In English:

PhD Programme in Chemical Engineering and Environmental Technology (3 years, 240 ECTS)

Language(s) of instruction: Greek

- **Programme's status:** Choose Status
- **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 300.1.1/1 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. The answers' documentation should be brief and accurate and supported by the relevant documentation. Referral to annexes should be made only when necessary.*

- *In particular, under each assessment area and by using the 2nd column of each table, the HEI must respond on the following:*

  - *the areas of improvement and recommendations of the EEC*
  - *the conclusions and final remarks noted by the EEC*

- *The institution should respond to the EEC comments, in the designated area next each comment. The comments of the EEC should be copied from the EEC report **without any interference** in the content.*

- *In case of annexes, those should be attached and sent on separate document(s). Each document should be in *.pdf format and named as annex1, annex2, etc.*

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

Areas of improvement and recommendations for BSc

Q1) Enhance the involvement of external stakeholders, including employers, industrial practitioners, and subject experts from other institutions, especially those in recognized research environments.

Actions Taken by the Institution

AN1) Such involvement of external stakeholders has already been done to a certain extent. For example, we have stated that several laboratory exercises are conducted or are planned to be conducted at different industries where employees provide their knowledge to the students. Specifically, the students of CEN 302 "Chemical Technology Laboratory" conduct a lab exercise at the Innovating Environmental Solutions Center (IESC Ltd) located in Limassol. The Department aims to further strengthen the programme by providing an additional lab exercise of CEN 302 at the premises of a relevant industry. Moreover, the practical training course (CEN 309) takes place in the industry, while the Department organizes several events (e.g. invited talks from the industry and public sector, workshops, practical training courses/sessions) with the participation of various stakeholders. These actions will be further extended over the next few years.

Q2) Increase the frequency of course and program reviews, considering an annual or biennial cycle to ensure ongoing improvement. Given the program's relative newness, the recent completion of a program review cycle is unclear.

Actions Taken by the Institution

AN2) The program is revised constantly by the Departmental Undergraduate Studies Committee (USC). The specific committee is responsible for constantly monitoring the programme, taking action to propose solutions when problems arise as well as to inform the Departmental Board about cases that cannot be independently solved by USC. An annual review of the programme will be targeted, between the USC and student representatives.

Q3) Conduct a top-down review of the program to course level to address repetitions, and include topics such as computer applications, programming, artificial intelligence and machine learning, engineering thermodynamics, sustainability and ethics, process safety, group design, and teamwork throughout the curriculum.

Actions Taken by the Institution

AN3) a) We have conducted a complete review of the curriculum and we have indeed identified a few cases of repetition. An important case is the introduction of students to mass and energy balances in CEN 111 "Introduction to Chemical Engineering", which are also taught in more detail during CEN 206 "Mass and Energy Balance". However, it should be noted that the introduction in CEN 111 constitutes only an introductory course, which is needed to cover the rest of the material. Thus, the description of the specific course has been modified aiming to clarify that the teaching of

mass and energy balances in CEN 111 consists only introductory material. Moreover, in CEN 204 "Applied Thermodynamics I" students are taught chemical kinetics, which is additionally taught in CEN 210 "Chemical Reaction Engineering". Since chemical kinetics, as pointed out by the EEC, is not relevant content to a thermodynamics course, we have removed the specific material from the description of CEN 204 and thermodynamics content has been added instead. The revised course descriptions are provided in Annex 1.

b) Aiming to introduce students to Aspen Hysys simulations prior teaching of CEN 311, based on a point raised by the EEC during the meeting with the teaching staff on May 26th 2023, a few simple simulations in the Unit operations courses (CEN 209 "Unit Operations I" and CEN 327 "Unit Operations II") as well as CEN 307 "Chemical Reactor Design and Installation" will be included. For example, during an additional tutorial of CEN 209 students could be instructed on the use of simple modules of Hysys and perform the simulation of a pump and a heat exchanger operation to meet specific conditions (e.g. calculation of the cold fluid flow rate to reach a prespecified exit temperature of the hot fluid). Similarly, during CEN 327 students could simulate the distillation process of a multi-component mixture and of an adsorption column, while in CEN 307 the non-isothermal operation of chemical reactors (which usually cannot be solved analytically) could be simulated. In the same courses (CEN 209, CEN 307 and CEN 327), it has been clarified that the project given to students is computational using Matlab and performed in groups. The revised descriptions of the aforementioned courses are also provided in Annex I.

c) The content of CEN 305 has been almost completely revised to introduce additional engineering thermodynamics material. We have also decided to convert the Environmental Chemical Engineering Specialization module CEN 321 "Wastewater and Liquid Waste Treatment Technologies" into a core module given its high importance to Chemical Engineers. Furthermore, the content of the course has been modified to cover more sustainability issues as per the Committee's suggestion. The revised description is available in Annex 1. Based on this change, one module from the Petrochemical Engineering Specialization should be removed. We have selected CEN 329 "Detection and Utilization of Hydrocarbon Reservoirs" which is the course least related to Chemical Engineering. However, given that the modified curriculum will be applicable to students enrolling in September 2023, the specific change will be implemented after 2 years (the inclusion of more sustainability related content will be applied immediately though). The revised course descriptions of both CEN 305 and CEN 321 are also provided in Annex I.

d) Regarding process and lab safety issues, such topics are always covered during the introductory lecture in every laboratory course. Based on the comment of the committee, the specific topic has been now included in the introductory course CEN 100 "Professional Skills for Chemical Engineers" of the first semester (see Annex I for the revised description).

e) Aiming to add further computational courses, we need to remove courses already included in the curriculum. As discussed during the meeting, the objective here is to remove non-essential Engineering courses such as CEN 213 "Engineering Mechanics" and CEN 306 "Electrical Circuits" and replace them with new computational courses. Given that both courses that should be removed comprise a suggestion, since the establishment of the Chemical Engineering programme of CUT, by the Cyprus Scientific and Technical Chamber (CSTC), prior their removal from the curriculum the specific change should be first confirmed with CSTC. However, we have enriched in the meantime

the description of CEN 301 "Dynamic Simulation with the Use of Computers" (see Annex I for the revised description).

Areas of improvement and recommendations for PhD

Q4) Consider enhancing the involvement of subject experts from recognized research environments in the evaluation committee for theses.

Actions Taken by the Institution

AN4) According to the University's regulations, external members of the PhD dissertation Examination Committee must possess expertise relevant to the subject of the dissertation and comply with specified regulations. Additionally, it is essential to avoid any conflict of interest between the student and external evaluators. Therefore, each member of the Examination Committee, apart from the Research Advisor, is required to submit a statement declaring any potential conflict of interest. The composition of the examination committee, including a declaration of the relevance of the research expertise of each member to the topic of the PhD Thesis, is approved first by the Departmental Board followed by the Faculty Board. To ensure that the members of the Examination Committee are indeed experts in the topic of the PhD Thesis, the research advisor should document their qualifications and expertise. This documentation should be presented in a comprehensive manner to the Departmental Board, providing detailed information about the external members' backgrounds and areas of specialization. According to University's regulations, at least one external examiner (coming from a different University or Institution) should be included in the external committee, while the additional examiner of the committee could be either an internal or external faculty member. Thus, although University regulations already require the involvement of external subject experts in the PhD Examination Committee, the Department will further promote the inclusion of experts from recognized research environments to enhance the quality of the programme.

Q5) Offer optional short courses in research methods, programming, career planning, project management, and other relevant areas to all PhD students, tailoring recommendations to individual students' needs.

Actions Taken by the Institution

AN5) The Department of Chemical Engineering (DCE) has implemented several strategies and will implement even more if necessary to enhance the learning experiences of its PhD students. The following points outline the initiatives and resources offered by the Department:

a) Through the Learning Development Network (LDN) of Cyprus University of Technology (CUT), PhD students can participate in several courses offered. LDN aims to design and implement seminars and workshops based on innovative teaching practices, promote the exchange of good teaching practices, contribute to the long-term educational policy of the University, provide continuous support for academic practice, and coordinate and operate new, creative learning spaces at the University (https://ldn.cut.ac.cy/). DCE should specify the minimum number of courses offered by LDN that PhD students should attend per year.
b) The Department organizes a mandatory seminar series that PhD students are required to attend. These seminars aim to equip students with essential knowledge relevant to their research area.

The seminars include academic lectures by external researchers or professors, presentations on statistical packages and professional skills training. Moreover, neither the teaching and research staff nor the PhD students are required to pay additional tuition fees to participate in the seminars.

c) The LDN of CUT organizes a Summer School every year for doctoral students from the 8 Universities participating in the alliance of the European University of Technology (EUt+). The Summer School program includes lectures, discussions, exercises and networking activities delivered in English. The Summer School aims to introduce students to their new role as PhD candidates and provide them with tools to manage projects, research education, work/life balance and collaboration with supervisors. The first-year PhD students of DCE will be encouraged to attend this course.

d) Through research-funded projects, workshops or training schools are organized by faculty members of the Department, providing opportunities for PhD students to attend. For example, the specialized training school "Ecofriendly multipurpose Biobased Products from municipal biowaste" was organized by LIFE EBP (a LIFE+ project focused on the valorization of the organic fraction of municipal solid waste for fertilizer production in agricultural applications https://www.lifeebp.eu/resources/posts/8/Leaflet%20EBP%20A5.pdf) between 13-14 October 2022 in Limassol at the premises of CUT. Moreover, the "An ocean of opportunities" hybrid training school on bridging the gap between applied sciences and commercialization potential with an in-depth workshop on communication and pitching the idea was organized at the premises of CUT, the Cyprus Marine Aquaculture Research Center of the DFMR and the Cyprus Marine and Maritime Institute between 2-6 May 2022. The training school was supported by the COST Action Ocean4Biotech (CA18238), the Junior Achievements Cyprus, the European University of Technology and the XPRO Consulting Limited, Cyprus (see also https://www.cmmi.blue/an-ocean-of-opportunities-hybrid-training-school/).

Student – centred learning, teaching and assessment

(ESG 1.3)

Areas of improvement and recommendations for BSc

Process of teaching and learning and student-centered teaching methodology

Q1) The process of teaching and learning should support students' individual and social development, including the development of national and European identity, social responsibility and active citizenship initiatives for chemical communities/industrial areas of Cyprus. The Head of department could follow the 4 purposes of higher education of the Council of Europe.

Actions Taken by the Institution

AN1) The 4 major purposes for higher education as identified by the Council of Europe are as follows: a) preparation for the labor market, b) preparation for life as active citizens in democratic societies, c) personal development and d) development of a broad and advanced knowledge base. Some of these are actually dealt with at university level, by one of the support groups of LDN (htttp://ldn.cut.ac.cy/el/) in CUT, that offers academic learning support and aims at developing the study and learning skills of students, including doctoral students and researchers, by offering training programmes in teaching and research skills, as well as in skills of writing research proposals.

LDN offers a series of integrated courses (seminars) on topics related to strengthening the knowledge and skills of both postgraduate and doctoral students. A few online seminars delivered over the past 2 years include the following topics: "Doctoral deadlines and selfcare" (this seminar referred to doctoral students and more specifically to the management of challenges arising from PhD studies), "Open discussion on accessibility and inclusion" (Roundtable discussion on issues of accessibility and inclusion in everyday life, student and professional life, virtual and face-to-face), and "Starting my own business: what should I know?" (the aim of the seminar was to explain basic concepts that should be known by students interested in starting their own business).

At departmental level, students also get acquainted with chemical, and other, industries through seminars given as part of courses CEN 407 "Studies and Career Interconnection Seminars I" and CEN 408 "Studies and Career Interconnection Seminars II".

Practical training

Q2) The duration of practical training of students, following discussion with them, could be possibly extended. The University could expand the list of the collaborating industries and companies that accept students for practical training and include also all the working environments in which Chemical Engineers could work in the future (public, private, remote). That would benefit both the students and also the public awareness about the department and the role of Chemical Engineering in society and in the local economy.

Actions Taken by the Institution

AN2) Although it would be desirable to extend the practical training, this is unfortunately difficult to achieve. Practical training starts upon completion of the examination period of the spring semester in early June and it should last between 4-6 weeks. If both the company and the student wish, the duration could be further extended until the end of August prior commencement of the next semester at the beginning of September. However, many companies in Cyprus substantially reduce their activity for approximately 2 weeks in August due to the vacation taken by their staff. This fact restricts

extending the duration of practical training for all students, given that it will be extremely difficult to secure the number of extended placements required to cover all students due to the aforementioned particularity.

DCE frequently updates the list of companies accepting students for practical training and, given that the programme has been active for only 6 years, the current list is increasing every year. Moreover, we would like to thank the committee for the recommendation to add organizations for practical training from the public sector. It should be noted that DCE already has students conducting their practical training in public authorities, such as the Sewerage Board of Limassol-Amathus and Larnaca Sewerage Board. Moreover, DCE has established a preliminary agreement to appoint students to the Cyprus Hydrocarbons Company (CHC), which is the National (State owned) Oil and Gas Company of Cyprus, and the Cyprus Organisation for Standardisation (CYS), which is the national standardisation body of Cyprus.

Areas of improvement and recommendations for PhD

Process of teaching and learning and student-centered teaching methodology

Q3) It would be a benefit for students to be able to take some ECTS-course credits, instead of having to rely on colleagues to learn necessary things, such as the use of MATLAB or similar.

Students are encouraged to take a more active role in creating the learning and research process and in being the future active citizens. Particularly PhD students in collaboration with administration and research officers shall be leaders in making CUT a young leader in Public Learning organizations (e.g. provide classes or mentoring for Chemeng students and public departments though CUT E--learning platform). We also suggest they be involved in making CUT a Research leader within public organizations.

Actions Taken by the Institution

AN3) PhD candidates have the option to enroll and earn credits in two undergraduate courses, as recommended by the Departmental Postgraduate Committee. If they do not possess a Master's degree, they should attend at least eight courses (up to two undergraduate and at least six postgraduate). Currently, students with a Master's degree are not required to take additional university courses, as they are credited with 60 ECTS. However, we acknowledge that there may be instances where PhD students, even those with a Master's degree, may need to acquire new knowledge or skills in order to effectively pursue their research. In these cases, students may, if they wish to, enroll to courses.
PhD students can additionally participate in the seminars offered by the LDN of CUT. Moreover, PhD candidates are obliged to participate in at least one taught laboratory course as Teaching Assistants. However, although DCE commits students for one laboratory course, the vast majority of students participate as Teaching Assistants in several courses.

Q4) The department could discuss ways for increasing the University Ranking through Research programs. First, there could be a better dissemination of ChemEng Research results of European Programs both internally with other departments of CUT and externally with other public Universities in order to make gradually an ecosystem of E-Universities in the Republic of Cyprus.

Actions Taken by the Institution

AN4) To address these suggestions, DCE plans to take the following actions:

a) Empowering PhD Students: DCE recognizes the importance of students taking an active role in shaping their learning experience and becoming future active citizens. The Department will actively collaborate with administration and research officers to provide opportunities for PhD students to lead initiatives, such as offering classes or mentoring programmes for undergraduate Chemical Engineering students and public departments through CUT's E-learning platform. This direction will not only enhance the learning experience, but also contribute to the development of leadership skills among the PhD students involved.
b) Establishing Research Leadership: Building upon the strengths of the Department's research programmes, DCE will work towards increasing the University Ranking through impactful research initiatives. Improved dissemination of Chemical Engineering research results obtained via European programmes will be prioritized, both internally within other Departments of CUT and externally with other public universities. Published papers and dissemination activities from research programmes will be communicated through departmental and university social media platforms.

2. Teaching staff
(ESG 1.5)

Areas of improvement and recommendations for BSc

Q1) Employment of more core-chemical-engineering faculty.

Actions Taken by the Institution

AN1) DCE agrees with the committee that it is essential to employ more faculty members with a first degree in Chemical Engineering. The specific requirement is part of the Strategic Plan of DCE. Towards this direction, DCE expects that two (2) more faculty members will be added in early 2024 and three (3) more by the end of 2025 based on running and planned hiring procedures.

Areas of improvement and recommendations for PhD

Q2) There are not many problems detected during this virtual visit, regarding the teaching staff of PhD programs. We do believe it would be helpful for students, enrolling with an MSc as their basis, to be able to take university courses. Presently students enrolled with an MSc degree are not supposed to do that. However, there can be a need for courses – even at PhD level – when trying to learn something new.

Actions Taken by the Institution

AN2) We would like to thank the committee for the observation that not many problems were detected during the virtual visit regarding the teaching staff in our PhD programme. DCE understands the importance of providing flexibility and opportunities for students holding a Master's degree to further enhance their knowledge and skills through university courses. As mentioned above, PhD candidates have the option to enroll and earn credits in two undergraduate courses, as recommended by the Departmental Postgraduate Committee. If they do not possess a Master's degree, they should attend at least eight courses (up to two undergraduate and at least six postgraduate). PhD students can additionally participate in the seminars offered by the LDN of CUT. Currently, students with a Master's degree are not required to take additional university courses, as they are credited with 60 ECTS. However, we acknowledge that there could be instances where PhD students, even those with a Master's degree, may need to acquire new knowledge or skills in order to effectively pursue their research.

The decision to credit 60 ECTS for students with a Master's degree is determined by the Postgraduate Studies Committee, followed by the approval of the Departmental Board. However, if a supervisor determines that a PhD student lacks the necessary background or expertise in a particular area, they have the option to propose that the student should take one or more courses to support the student. DCE strives to maintain a balance between providing students with the flexibility to pursue their research interests and ensuring they have the necessary skills and knowledge to succeed in their PhD studies. The consideration of additional courses for individual students constitutes a collaborative decision-making process between the student, their supervisor, and the relevant departmental committees.

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

Areas of improvement and recommendations for BSc

Q1) Consider streamlining a process to address cases where students may face difficulty in passing compulsory courses, such as issuing alternative awards (e.g., certificates or diplomas) with lesser requirements.

Actions Taken by the Institution

AN1) Unfortunately, alternative awards cannot be issued based on University regulations. To the best of our knowledge, public universities in Cyprus cannot issue alternative awards to accommodate cases where students face difficulty in passing specific compulsory courses.

Areas of improvement and recommendations for PhD

No specific areas of improvement identified.

4. Learning resources and student support
(ESG 1.6)

Areas of improvement and recommendations for BSc
Q1) A more integrated campus would be desirable.

Actions Taken by the Institution
AN1) DCE fully agrees that a more integrated campus would be desirable. To address this issue, the Department actively communicates and expresses its needs for a more integrated campus to the authorities of the University through the Dean of the faculty, where DCE highlights the benefits of creating spaces and initiatives that facilitate interdisciplinary interactions, shared resources and collaborative opportunities among different departments and disciplines.

Based on the University's Strategic Plan DCE is expected to move to a new building in Veregaria area situated outside the city center of Limassol. However, the specific plan requires several years to materialize and until then DCE will be confined within the dispersed premises currently available in the main campus of CUT in the center of Limassol.

Areas of improvement and recommendations for PhD
Q2) A more integrated campus would be desirable.

Actions Taken by the Institution
AN2) Please see our response in AN1 above.

5. Additional for doctoral programmes
(ALL ESG)

Areas of improvement and recommendations
Q1) The final assessment of PhD thesis may enhance the involvement of subject experts from recognized external research environments.

Actions Taken by the Institution
AN1) According to the University's regulations, external members of the PhD dissertation Examination Committee must possess expertise relevant to the subject of the dissertation. Additionally, it is essential to avoid any conflict of interest between the student and external evaluators. Therefore, each member of the Examination Committee, apart from the Research Advisor, is required to submit a statement declaring any potential conflict of interest. The composition of the examination committee, including a declaration of the relevance of the research expertise of each member to the topic of the PhD Thesis, is approved first by the Departmental Board followed by the Faculty Board. To ensure that the members of the Examination Committee are indeed experts in the topic of the PhD Thesis, the research advisor should document their qualifications and expertise. This documentation should be presented in a comprehensive manner to the Departmental Board, providing detailed information about the external members' backgrounds and areas of specialization.
Thus, although University regulations already require the involvement of external subject experts in the PhD Examination Committee, the Department will further promote the inclusion of experts from recognized research environments to enhance the quality of the programme.

7. Eligibility (Joint programme)

(ALL ESG)

N/A

Areas of improvement and recommendations **by EEC**	Actions Taken by the Institution	For Official Use ONLY
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Click or tap here to enter text.	Click or tap here to enter text.	Choose level of compliance:

B. Conclusions and final remarks

Recommendations:

• Q1) Recruitment of more faculty with core-chemical-engineering competences
• Q2) Better integration of facilities within the same (or closely situated) buildings
• Q3) There seems not to be much consciousness among students about representation and how to exert influence on programs, this makes the students an under-utilized resource in the development of the programs
• Q4) Somewhat more emphasis on practical operation of chemical engineering processing systems at intermediate to larger scale
• Q5) Develop access to practical experiences with larger scale processing equipment. Internships may help with this, but then internships must not reduce to analytical work only

Actions Taken by the Institution

• AN1) DCE anticipates that two (2) more faculty members will be recruited in early 2024 and three (3) more by the end of 2025.
• AN2) DCE is expected to move to a new building in Veregaria area (outside the city center of Limassol) as specified in the Strategic Plan of CUT.
• AN3) Students can bring up issues through the three (3) student representatives in the Departmental Board. Subsequently, the Departmental Undergraduate Studies Committee, which oversees handling of various tasks related to Undergraduate studies and the curriculum, is responsible to either directly resolve the issues raised by students or to inform the Departmental Board aiming to seek for optimal solutions.
• AN4+5) Currently students participate in one (1) laboratory practical experience at the IESC Innovating Environmental Solutions Center Ltd (http://www.iesc-ltd.com/) which is located in Ypsonas in Limassol as part of the laboratory exercises which are included in the course CEN 302 “Chemical Technology Laboratory”. DCE will supplement the specific course with an additional laboratory exercise that will be conducted at a relevant industry. A very small number of Internships covering analytical work only will be eliminated.

C. Higher Education Institution academic representatives

Name	*Position*	*Signature*
Michalis Koutinas	Department Chair	
Alexandros Charalambides	Program Coordinator	
Ioannis Vyrides	Postgraduate Studies Committee	
Pavlos Stefanou	Undergraduate Studies Committee	Παύλος Στεφάνου
Achilleas Konstantinou	Undergraduate Studies Committee	Αχιλλέας Κωνσταντίνου
Click to enter Name	Click to enter Position	

Date: 10/8/2023

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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)**

Programme 1 – BSc

In Greek:

Προπτυχιακό Πρόγραμμα στη Χημική Μηχανική (4 έτη, 240 ECTS)

In English:

Undergraduate Programme in Chemical Engineering (4 years, 240 ECTS

Language(s) of instruction: Greek

Programme 2 – PhD[Title 2]

In Greek:

Διδακτορικό Πρόγραμμα στη Χημική Μηχανική και Περιβαλλοντική Τεχνολογία (3 έτη, 240 ECTS)

In English:

PhD Programme in Chemical Engineering and Environmental Technology (3 years, 240 ECTS)

Language(s) of instruction: Greek

- **Programme's status:** Choose Status
- **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 300.1.1/1 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. The answers' documentation should be brief and accurate and supported by the relevant documentation. Referral to annexes should be made only when necessary.*

- *In particular, under each assessment area and by using the 2nd column of each table, the HEI must respond on the following:*

  - *the areas of improvement and recommendations of the EEC*
  - *the conclusions and final remarks noted by the EEC*

- *The institution should respond to the EEC comments, in the designated area next each comment. The comments of the EEC should be copied from the EEC report **without any interference** in the content.*

- *In case of annexes, those should be attached and sent on separate document(s). Each document should be in *.pdf format and named as annex1, annex2, etc.*

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

Areas of improvement and recommendations for BSc

Q1) Enhance the involvement of external stakeholders, including employers, industrial practitioners, and subject experts from other institutions, especially those in recognized research environments.

Actions Taken by the Institution

AN1) Such involvement of external stakeholders has already been done to a certain extent. For example, we have stated that several laboratory exercises are conducted or are planned to be conducted at different industries where employees provide their knowledge to the students. Specifically, the students of CEN 302 "Chemical Technology Laboratory" conduct a lab exercise at the Innovating Environmental Solutions Center (IESC Ltd) located in Limassol. The Department aims to further strengthen the programme by providing an additional lab exercise of CEN 302 at the premises of a relevant industry. Moreover, the practical training course (CEN 309) takes place in the industry, while the Department organizes several events (e.g. invited talks from the industry and public sector, workshops, practical training courses/sessions) with the participation of various stakeholders. These actions will be further extended over the next few years.

Q2) Increase the frequency of course and program reviews, considering an annual or biennial cycle to ensure ongoing improvement. Given the program's relative newness, the recent completion of a program review cycle is unclear.

Actions Taken by the Institution

AN2) The program is revised constantly by the Departmental Undergraduate Studies Committee (USC). The specific committee is responsible for constantly monitoring the programme, taking action to propose solutions when problems arise as well as to inform the Departmental Board about cases that cannot be independently solved by USC. An annual review of the programme will be targeted, between the USC and student representatives.

Q3) Conduct a top-down review of the program to course level to address repetitions, and include topics such as computer applications, programming, artificial intelligence and machine learning, engineering thermodynamics, sustainability and ethics, process safety, group design, and teamwork throughout the curriculum.

Actions Taken by the Institution

AN3) a) We have conducted a complete review of the curriculum and we have indeed identified a few cases of repetition. An important case is the introduction of students to mass and energy balances in CEN 111 "Introduction to Chemical Engineering", which are also taught in more detail during CEN 206 "Mass and Energy Balance". However, it should be noted that the introduction in CEN 111 constitutes only an introductory course, which is needed to cover the rest of the material. Thus, the description of the specific course has been modified aiming to clarify that the teaching of

mass and energy balances in CEN 111 consists only introductory material. Moreover, in CEN 204 "Applied Thermodynamics I" students are taught chemical kinetics, which is additionally taught in CEN 210 "Chemical Reaction Engineering". Since chemical kinetics, as pointed out by the EEC, is not relevant content to a thermodynamics course, we have removed the specific material from the description of CEN 204 and thermodynamics content has been added instead. The revised course descriptions are provided in Annex 1.

b) Aiming to introduce students to Aspen Hysys simulations prior teaching of CEN 311, based on a point raised by the EEC during the meeting with the teaching staff on May 26th 2023, a few simple simulations in the Unit operations courses (CEN 209 "Unit Operations I" and CEN 327 "Unit Operations II") as well as CEN 307 "Chemical Reactor Design and Installation" will be included. For example, during an additional tutorial of CEN 209 students could be instructed on the use of simple modules of Hysys and perform the simulation of a pump and a heat exchanger operation to meet specific conditions (e.g. calculation of the cold fluid flow rate to reach a prespecified exit temperature of the hot fluid). Similarly, during CEN 327 students could simulate the distillation process of a multi-component mixture and of an adsorption column, while in CEN 307 the non-isothermal operation of chemical reactors (which usually cannot be solved analytically) could be simulated. In the same courses (CEN 209, CEN 307 and CEN 327), it has been clarified that the project given to students is computational using Matlab and performed in groups. The revised descriptions of the aforementioned courses are also provided in Annex I.

c) The content of CEN 305 has been almost completely revised to introduce additional engineering thermodynamics material. We have also decided to convert the Environmental Chemical Engineering Specialization module CEN 321 "Wastewater and Liquid Waste Treatment Technologies" into a core module given its high importance to Chemical Engineers. Furthermore, the content of the course has been modified to cover more sustainability issues as per the Committee's suggestion. The revised description is available in Annex 1. Based on this change, one module from the Petrochemical Engineering Specialization should be removed. We have selected CEN 329 "Detection and Utilization of Hydrocarbon Reservoirs" which is the course least related to Chemical Engineering. However, given that the modified curriculum will be applicable to students enrolling in September 2023, the specific change will be implemented after 2 years (the inclusion of more sustainability related content will be applied immediately though). The revised course descriptions of both CEN 305 and CEN 321 are also provided in Annex I.

d) Regarding process and lab safety issues, such topics are always covered during the introductory lecture in every laboratory course. Based on the comment of the committee, the specific topic has been now included in the introductory course CEN 100 "Professional Skills for Chemical Engineers" of the first semester (see Annex I for the revised description).

e) Aiming to add further computational courses, we need to remove courses already included in the curriculum. As discussed during the meeting, the objective here is to remove non-essential Engineering courses such as CEN 213 "Engineering Mechanics" and CEN 306 "Electrical Circuits" and replace them with new computational courses. Given that both courses that should be removed comprise a suggestion, since the establishment of the Chemical Engineering programme of CUT, by the Cyprus Scientific and Technical Chamber (CSTC), prior their removal from the curriculum the specific change should be first confirmed with CSTC. However, we have enriched in the meantime

the description of CEN 301 "Dynamic Simulation with the Use of Computers" (see Annex I for the revised description).

Areas of improvement and recommendations for PhD

Q4) Consider enhancing the involvement of subject experts from recognized research environments in the evaluation committee for theses.

Actions Taken by the Institution

AN4) According to the University's regulations, external members of the PhD dissertation Examination Committee must possess expertise relevant to the subject of the dissertation and comply with specified regulations. Additionally, it is essential to avoid any conflict of interest between the student and external evaluators. Therefore, each member of the Examination Committee, apart from the Research Advisor, is required to submit a statement declaring any potential conflict of interest. The composition of the examination committee, including a declaration of the relevance of the research expertise of each member to the topic of the PhD Thesis, is approved first by the Departmental Board followed by the Faculty Board. To ensure that the members of the Examination Committee are indeed experts in the topic of the PhD Thesis, the research advisor should document their qualifications and expertise. This documentation should be presented in a comprehensive manner to the Departmental Board, providing detailed information about the external members' backgrounds and areas of specialization. According to University's regulations, at least one external examiner (coming from a different University or Institution) should be included in the external committee, while the additional examiner of the committee could be either an internal or external faculty member. Thus, although University regulations already require the involvement of external subject experts in the PhD Examination Committee, the Department will further promote the inclusion of experts from recognized research environments to enhance the quality of the programme.

Q5) Offer optional short courses in research methods, programming, career planning, project management, and other relevant areas to all PhD students, tailoring recommendations to individual students' needs.

Actions Taken by the Institution

AN5) The Department of Chemical Engineering (DCE) has implemented several strategies and will implement even more if necessary to enhance the learning experiences of its PhD students. The following points outline the initiatives and resources offered by the Department:

a) Through the Learning Development Network (LDN) of Cyprus University of Technology (CUT), PhD students can participate in several courses offered. LDN aims to design and implement seminars and workshops based on innovative teaching practices, promote the exchange of good teaching practices, contribute to the long-term educational policy of the University, provide continuous support for academic practice, and coordinate and operate new, creative learning spaces at the University (https://ldn.cut.ac.cy/). DCE should specify the minimum number of courses offered by LDN that PhD students should attend per year.
b) The Department organizes a mandatory seminar series that PhD students are required to attend. These seminars aim to equip students with essential knowledge relevant to their research area.

The seminars include academic lectures by external researchers or professors, presentations on statistical packages and professional skills training. Moreover, neither the teaching and research staff nor the PhD students are required to pay additional tuition fees to participate in the seminars.

c) The LDN of CUT organizes a Summer School every year for doctoral students from the 8 Universities participating in the alliance of the European University of Technology (EUt+). The Summer School program includes lectures, discussions, exercises and networking activities delivered in English. The Summer School aims to introduce students to their new role as PhD candidates and provide them with tools to manage projects, research education, work/life balance and collaboration with supervisors. The first-year PhD students of DCE will be encouraged to attend this course.

d) Through research-funded projects, workshops or training schools are organized by faculty members of the Department, providing opportunities for PhD students to attend. For example, the specialized training school "Ecofriendly multipurpose Biobased Products from municipal biowaste" was organized by LIFE EBP (a LIFE+ project focused on the valorization of the organic fraction of municipal solid waste for fertilizer production in agricultural applications https://www.lifeebp.eu/resources/posts/8/Leaflet%20EBP%20A5.pdf) between 13-14 October 2022 in Limassol at the premises of CUT. Moreover, the "An ocean of opportunities" hybrid training school on bridging the gap between applied sciences and commercialization potential with an in-depth workshop on communication and pitching the idea was organized at the premises of CUT, the Cyprus Marine Aquaculture Research Center of the DFMR and the Cyprus Marine and Maritime Institute between 2-6 May 2022. The training school was supported by the COST Action Ocean4Biotech (CA18238), the Junior Achievements Cyprus, the European University of Technology and the XPRO Consulting Limited, Cyprus (see also https://www.cmmi.blue/an-ocean-of-opportunities-hybrid-training-school/).

Student – centred learning, teaching and assessment

(ESG 1.3)

Areas of improvement and recommendations for BSc

Process of teaching and learning and student-centered teaching methodology

Q1) The process of teaching and learning should support students' individual and social development, including the development of national and European identity, social responsibility and active citizenship initiatives for chemical communities/industrial areas of Cyprus. The Head of department could follow the 4 purposes of higher education of the Council of Europe.

Actions Taken by the Institution

AN1) The 4 major purposes for higher education as identified by the Council of Europe are as follows: a) preparation for the labor market, b) preparation for life as active citizens in democratic societies, c) personal development and d) development of a broad and advanced knowledge base. Some of these are actually dealt with at university level, by one of the support groups of LDN (htttp://ldn.cut.ac.cy/el/) in CUT, that offers academic learning support and aims at developing the study and learning skills of students, including doctoral students and researchers, by offering training programmes in teaching and research skills, as well as in skills of writing research proposals.

LDN offers a series of integrated courses (seminars) on topics related to strengthening the knowledge and skills of both postgraduate and doctoral students. A few online seminars delivered over the past 2 years include the following topics: "Doctoral deadlines and selfcare" (this seminar referred to doctoral students and more specifically to the management of challenges arising from PhD studies), "Open discussion on accessibility and inclusion" (Roundtable discussion on issues of accessibility and inclusion in everyday life, student and professional life, virtual and face-to-face), and "Starting my own business: what should I know?" (the aim of the seminar was to explain basic concepts that should be known by students interested in starting their own business).

At departmental level, students also get acquainted with chemical, and other, industries through seminars given as part of courses CEN 407 "Studies and Career Interconnection Seminars I" and CEN 408 "Studies and Career Interconnection Seminars II".

Practical training

Q2) The duration of practical training of students, following discussion with them, could be possibly extended. The University could expand the list of the collaborating industries and companies that accept students for practical training and include also all the working environments in which Chemical Engineers could work in the future (public, private, remote). That would benefit both the students and also the public awareness about the department and the role of Chemical Engineering in society and in the local economy.

Actions Taken by the Institution

AN2) Although it would be desirable to extend the practical training, this is unfortunately difficult to achieve. Practical training starts upon completion of the examination period of the spring semester in early June and it should last between 4-6 weeks. If both the company and the student wish, the duration could be further extended until the end of August prior commencement of the next semester at the beginning of September. However, many companies in Cyprus substantially reduce their activity for approximately 2 weeks in August due to the vacation taken by their staff. This fact restricts

extending the duration of practical training for all students, given that it will be extremely difficult to secure the number of extended placements required to cover all students due to the aforementioned particularity.

DCE frequently updates the list of companies accepting students for practical training and, given that the programme has been active for only 6 years, the current list is increasing every year. Moreover, we would like to thank the committee for the recommendation to add organizations for practical training from the public sector. It should be noted that DCE already has students conducting their practical training in public authorities, such as the Sewerage Board of Limassol-Amathus and Larnaca Sewerage Board. Moreover, DCE has established a preliminary agreement to appoint students to the Cyprus Hydrocarbons Company (CHC), which is the National (State owned) Oil and Gas Company of Cyprus, and the Cyprus Organisation for Standardisation (CYS), which is the national standardisation body of Cyprus.

Areas of improvement and recommendations for PhD

Process of teaching and learning and student-centered teaching methodology

Q3) It would be a benefit for students to be able to take some ECTS-course credits, instead of having to rely on colleagues to learn necessary things, such as the use of MATLAB or similar.

Students are encouraged to take a more active role in creating the learning and research process and in being the future active citizens. Particularly PhD students in collaboration with administration and research officers shall be leaders in making CUT a young leader in Public Learning organizations (e.g. provide classes or mentoring for Chemeng students and public departments though CUT E--learning platform). We also suggest they be involved in making CUT a Research leader within public organizations.

Actions Taken by the Institution

AN3) PhD candidates have the option to enroll and earn credits in two undergraduate courses, as recommended by the Departmental Postgraduate Committee. If they do not possess a Master's degree, they should attend at least eight courses (up to two undergraduate and at least six postgraduate). Currently, students with a Master's degree are not required to take additional university courses, as they are credited with 60 ECTS. However, we acknowledge that there may be instances where PhD students, even those with a Master's degree, may need to acquire new knowledge or skills in order to effectively pursue their research. In these cases, students may, if they wish to, enroll to courses.
PhD students can additionally participate in the seminars offered by the LDN of CUT. Moreover, PhD candidates are obliged to participate in at least one taught laboratory course as Teaching Assistants. However, although DCE commits students for one laboratory course, the vast majority of students participate as Teaching Assistants in several courses.

Q4) The department could discuss ways for increasing the University Ranking through Research programs. First, there could be a better dissemination of ChemEng Research results of European Programs both internally with other departments of CUT and externally with other public Universities in order to make gradually an ecosystem of E-Universities in the Republic of Cyprus.

Actions Taken by the Institution

AN4) To address these suggestions, DCE plans to take the following actions:

a) Empowering PhD Students: DCE recognizes the importance of students taking an active role in shaping their learning experience and becoming future active citizens. The Department will actively collaborate with administration and research officers to provide opportunities for PhD students to lead initiatives, such as offering classes or mentoring programmes for undergraduate Chemical Engineering students and public departments through CUT's E-learning platform. This direction will not only enhance the learning experience, but also contribute to the development of leadership skills among the PhD students involved.
b) Establishing Research Leadership: Building upon the strengths of the Department's research programmes, DCE will work towards increasing the University Ranking through impactful research initiatives. Improved dissemination of Chemical Engineering research results obtained via European programmes will be prioritized, both internally within other Departments of CUT and externally with other public universities. Published papers and dissemination activities from research programmes will be communicated through departmental and university social media platforms.

2. Teaching staff
(ESG 1.5)

Areas of improvement and recommendations for BSc

Q1) Employment of more core-chemical-engineering faculty.

Actions Taken by the Institution

AN1) DCE agrees with the committee that it is essential to employ more faculty members with a first degree in Chemical Engineering. The specific requirement is part of the Strategic Plan of DCE. Towards this direction, DCE expects that two (2) more faculty members will be added in early 2024 and three (3) more by the end of 2025 based on running and planned hiring procedures.

Areas of improvement and recommendations for PhD

Q2) There are not many problems detected during this virtual visit, regarding the teaching staff of PhD programs. We do believe it would be helpful for students, enrolling with an MSc as their basis, to be able to take university courses. Presently students enrolled with an MSc degree are not supposed to do that. However, there can be a need for courses – even at PhD level – when trying to learn something new.

Actions Taken by the Institution

AN2) We would like to thank the committee for the observation that not many problems were detected during the virtual visit regarding the teaching staff in our PhD programme. DCE understands the importance of providing flexibility and opportunities for students holding a Master's degree to further enhance their knowledge and skills through university courses. As mentioned above, PhD candidates have the option to enroll and earn credits in two undergraduate courses, as recommended by the Departmental Postgraduate Committee. If they do not possess a Master's degree, they should attend at least eight courses (up to two undergraduate and at least six postgraduate). PhD students can additionally participate in the seminars offered by the LDN of CUT. Currently, students with a Master's degree are not required to take additional university courses, as they are credited with 60 ECTS. However, we acknowledge that there could be instances where PhD students, even those with a Master's degree, may need to acquire new knowledge or skills in order to effectively pursue their research.

The decision to credit 60 ECTS for students with a Master's degree is determined by the Postgraduate Studies Committee, followed by the approval of the Departmental Board. However, if a supervisor determines that a PhD student lacks the necessary background or expertise in a particular area, they have the option to propose that the student should take one or more courses to support the student. DCE strives to maintain a balance between providing students with the flexibility to pursue their research interests and ensuring they have the necessary skills and knowledge to succeed in their PhD studies. The consideration of additional courses for individual students constitutes a collaborative decision-making process between the student, their supervisor, and the relevant departmental committees.

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

Areas of improvement and recommendations for BSc

Q1) Consider streamlining a process to address cases where students may face difficulty in passing compulsory courses, such as issuing alternative awards (e.g., certificates or diplomas) with lesser requirements.

Actions Taken by the Institution

AN1) Unfortunately, alternative awards cannot be issued based on University regulations. To the best of our knowledge, public universities in Cyprus cannot issue alternative awards to accommodate cases where students face difficulty in passing specific compulsory courses.

Areas of improvement and recommendations for PhD

No specific areas of improvement identified.

4. Learning resources and student support
(ESG 1.6)

Areas of improvement and recommendations for BSc
Q1) A more integrated campus would be desirable.

Actions Taken by the Institution
AN1) DCE fully agrees that a more integrated campus would be desirable. To address this issue, the Department actively communicates and expresses its needs for a more integrated campus to the authorities of the University through the Dean of the faculty, where DCE highlights the benefits of creating spaces and initiatives that facilitate interdisciplinary interactions, shared resources and collaborative opportunities among different departments and disciplines.

Based on the University's Strategic Plan DCE is expected to move to a new building in Veregaria area situated outside the city center of Limassol. However, the specific plan requires several years to materialize and until then DCE will be confined within the dispersed premises currently available in the main campus of CUT in the center of Limassol.

Areas of improvement and recommendations for PhD
Q2) A more integrated campus would be desirable.

Actions Taken by the Institution
AN2) Please see our response in AN1 above.

5. Additional for doctoral programmes
(ALL ESG)

Areas of improvement and recommendations
Q1) The final assessment of PhD thesis may enhance the involvement of subject experts from recognized external research environments.

Actions Taken by the Institution
AN1) According to the University's regulations, external members of the PhD dissertation Examination Committee must possess expertise relevant to the subject of the dissertation. Additionally, it is essential to avoid any conflict of interest between the student and external evaluators. Therefore, each member of the Examination Committee, apart from the Research Advisor, is required to submit a statement declaring any potential conflict of interest. The composition of the examination committee, including a declaration of the relevance of the research expertise of each member to the topic of the PhD Thesis, is approved first by the Departmental Board followed by the Faculty Board. To ensure that the members of the Examination Committee are indeed experts in the topic of the PhD Thesis, the research advisor should document their qualifications and expertise. This documentation should be presented in a comprehensive manner to the Departmental Board, providing detailed information about the external members' backgrounds and areas of specialization.
Thus, although University regulations already require the involvement of external subject experts in the PhD Examination Committee, the Department will further promote the inclusion of experts from recognized research environments to enhance the quality of the programme.

7. Eligibility (Joint programme)

(ALL ESG)

N/A

Areas of improvement and recommendations **by EEC**	Actions Taken by the Institution	For Official Use ONLY
Click or tap here to enter text.	Click or tap here to enter text.	Choose level of compliance:
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Click or tap here to enter text.	Click or tap here to enter text.	Choose level of compliance:
Click or tap here to enter text.	Click or tap here to enter text.	Choose level of compliance:

B. Conclusions and final remarks

Recommendations:

• Q1) Recruitment of more faculty with core-chemical-engineering competences
• Q2) Better integration of facilities within the same (or closely situated) buildings
• Q3) There seems not to be much consciousness among students about representation and how to exert influence on programs, this makes the students an under-utilized resource in the development of the programs
• Q4) Somewhat more emphasis on practical operation of chemical engineering processing systems at intermediate to larger scale
• Q5) Develop access to practical experiences with larger scale processing equipment. Internships may help with this, but then internships must not reduce to analytical work only

Actions Taken by the Institution

• AN1) DCE anticipates that two (2) more faculty members will be recruited in early 2024 and three (3) more by the end of 2025.
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Name	*Position*	*Signature*
Michalis Koutinas	Department Chair	
Alexandros Charalambides	Program Coordinator	
Ioannis Vyrides	Postgraduate Studies Committee	
Pavlos Stefanou	Undergraduate Studies Committee	Παύλος Στεφάνου
Achilleas Konstantinou	Undergraduate Studies Committee	Αχιλλέας Κωνσταντίνου
Click to enter Name	Click to enter Position	

Date: 10/8/2023

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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)**

Programme 1 – BSc

In Greek:

Προπτυχιακό Πρόγραμμα στη Χημική Μηχανική (4 έτη, 240 ECTS)

In English:

Undergraduate Programme in Chemical Engineering (4 years, 240 ECTS

Language(s) of instruction: Greek

Programme 2 – PhD[Title 2]

In Greek:

Διδακτορικό Πρόγραμμα στη Χημική Μηχανική και Περιβαλλοντική Τεχνολογία (3 έτη, 240 ECTS)

In English:

PhD Programme in Chemical Engineering and Environmental Technology (3 years, 240 ECTS)

Language(s) of instruction: Greek

- **Programme's status:** Choose Status
- **Concentrations (if any):**

In Greek: Concentrations

In English: Concentrations

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- *The Higher Education Institution (HEI) based on the External Evaluation Committee's (EEC's) evaluation report (Doc.300.1.1 or 300.1.1/1 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. The answers' documentation should be brief and accurate and supported by the relevant documentation. Referral to annexes should be made only when necessary.*

- *In particular, under each assessment area and by using the 2nd column of each table, the HEI must respond on the following:*

  - *the areas of improvement and recommendations of the EEC*
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- *The institution should respond to the EEC comments, in the designated area next each comment. The comments of the EEC should be copied from the EEC report **without any interference** in the content.*

- *In case of annexes, those should be attached and sent on separate document(s). Each document should be in *.pdf format and named as annex1, annex2, etc.*

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

Areas of improvement and recommendations for BSc

Q1) Enhance the involvement of external stakeholders, including employers, industrial practitioners, and subject experts from other institutions, especially those in recognized research environments.

Actions Taken by the Institution

AN1) Such involvement of external stakeholders has already been done to a certain extent. For example, we have stated that several laboratory exercises are conducted or are planned to be conducted at different industries where employees provide their knowledge to the students. Specifically, the students of CEN 302 "Chemical Technology Laboratory" conduct a lab exercise at the Innovating Environmental Solutions Center (IESC Ltd) located in Limassol. The Department aims to further strengthen the programme by providing an additional lab exercise of CEN 302 at the premises of a relevant industry. Moreover, the practical training course (CEN 309) takes place in the industry, while the Department organizes several events (e.g. invited talks from the industry and public sector, workshops, practical training courses/sessions) with the participation of various stakeholders. These actions will be further extended over the next few years.

Q2) Increase the frequency of course and program reviews, considering an annual or biennial cycle to ensure ongoing improvement. Given the program's relative newness, the recent completion of a program review cycle is unclear.

Actions Taken by the Institution

AN2) The program is revised constantly by the Departmental Undergraduate Studies Committee (USC). The specific committee is responsible for constantly monitoring the programme, taking action to propose solutions when problems arise as well as to inform the Departmental Board about cases that cannot be independently solved by USC. An annual review of the programme will be targeted, between the USC and student representatives.

Q3) Conduct a top-down review of the program to course level to address repetitions, and include topics such as computer applications, programming, artificial intelligence and machine learning, engineering thermodynamics, sustainability and ethics, process safety, group design, and teamwork throughout the curriculum.

Actions Taken by the Institution

AN3) a) We have conducted a complete review of the curriculum and we have indeed identified a few cases of repetition. An important case is the introduction of students to mass and energy balances in CEN 111 "Introduction to Chemical Engineering", which are also taught in more detail during CEN 206 "Mass and Energy Balance". However, it should be noted that the introduction in CEN 111 constitutes only an introductory course, which is needed to cover the rest of the material. Thus, the description of the specific course has been modified aiming to clarify that the teaching of

mass and energy balances in CEN 111 consists only introductory material. Moreover, in CEN 204 "Applied Thermodynamics I" students are taught chemical kinetics, which is additionally taught in CEN 210 "Chemical Reaction Engineering". Since chemical kinetics, as pointed out by the EEC, is not relevant content to a thermodynamics course, we have removed the specific material from the description of CEN 204 and thermodynamics content has been added instead. The revised course descriptions are provided in Annex 1.

b) Aiming to introduce students to Aspen Hysys simulations prior teaching of CEN 311, based on a point raised by the EEC during the meeting with the teaching staff on May 26th 2023, a few simple simulations in the Unit operations courses (CEN 209 "Unit Operations I" and CEN 327 "Unit Operations II") as well as CEN 307 "Chemical Reactor Design and Installation" will be included. For example, during an additional tutorial of CEN 209 students could be instructed on the use of simple modules of Hysys and perform the simulation of a pump and a heat exchanger operation to meet specific conditions (e.g. calculation of the cold fluid flow rate to reach a prespecified exit temperature of the hot fluid). Similarly, during CEN 327 students could simulate the distillation process of a multi-component mixture and of an adsorption column, while in CEN 307 the non-isothermal operation of chemical reactors (which usually cannot be solved analytically) could be simulated. In the same courses (CEN 209, CEN 307 and CEN 327), it has been clarified that the project given to students is computational using Matlab and performed in groups. The revised descriptions of the aforementioned courses are also provided in Annex I.

c) The content of CEN 305 has been almost completely revised to introduce additional engineering thermodynamics material. We have also decided to convert the Environmental Chemical Engineering Specialization module CEN 321 "Wastewater and Liquid Waste Treatment Technologies" into a core module given its high importance to Chemical Engineers. Furthermore, the content of the course has been modified to cover more sustainability issues as per the Committee's suggestion. The revised description is available in Annex 1. Based on this change, one module from the Petrochemical Engineering Specialization should be removed. We have selected CEN 329 "Detection and Utilization of Hydrocarbon Reservoirs" which is the course least related to Chemical Engineering. However, given that the modified curriculum will be applicable to students enrolling in September 2023, the specific change will be implemented after 2 years (the inclusion of more sustainability related content will be applied immediately though). The revised course descriptions of both CEN 305 and CEN 321 are also provided in Annex I.

d) Regarding process and lab safety issues, such topics are always covered during the introductory lecture in every laboratory course. Based on the comment of the committee, the specific topic has been now included in the introductory course CEN 100 "Professional Skills for Chemical Engineers" of the first semester (see Annex I for the revised description).

e) Aiming to add further computational courses, we need to remove courses already included in the curriculum. As discussed during the meeting, the objective here is to remove non-essential Engineering courses such as CEN 213 "Engineering Mechanics" and CEN 306 "Electrical Circuits" and replace them with new computational courses. Given that both courses that should be removed comprise a suggestion, since the establishment of the Chemical Engineering programme of CUT, by the Cyprus Scientific and Technical Chamber (CSTC), prior their removal from the curriculum the specific change should be first confirmed with CSTC. However, we have enriched in the meantime

the description of CEN 301 "Dynamic Simulation with the Use of Computers" (see Annex I for the revised description).

Areas of improvement and recommendations for PhD

Q4) Consider enhancing the involvement of subject experts from recognized research environments in the evaluation committee for theses.

Actions Taken by the Institution

AN4) According to the University's regulations, external members of the PhD dissertation Examination Committee must possess expertise relevant to the subject of the dissertation and comply with specified regulations. Additionally, it is essential to avoid any conflict of interest between the student and external evaluators. Therefore, each member of the Examination Committee, apart from the Research Advisor, is required to submit a statement declaring any potential conflict of interest. The composition of the examination committee, including a declaration of the relevance of the research expertise of each member to the topic of the PhD Thesis, is approved first by the Departmental Board followed by the Faculty Board. To ensure that the members of the Examination Committee are indeed experts in the topic of the PhD Thesis, the research advisor should document their qualifications and expertise. This documentation should be presented in a comprehensive manner to the Departmental Board, providing detailed information about the external members' backgrounds and areas of specialization. According to University's regulations, at least one external examiner (coming from a different University or Institution) should be included in the external committee, while the additional examiner of the committee could be either an internal or external faculty member. Thus, although University regulations already require the involvement of external subject experts in the PhD Examination Committee, the Department will further promote the inclusion of experts from recognized research environments to enhance the quality of the programme.

Q5) Offer optional short courses in research methods, programming, career planning, project management, and other relevant areas to all PhD students, tailoring recommendations to individual students' needs.

Actions Taken by the Institution

AN5) The Department of Chemical Engineering (DCE) has implemented several strategies and will implement even more if necessary to enhance the learning experiences of its PhD students. The following points outline the initiatives and resources offered by the Department:

a) Through the Learning Development Network (LDN) of Cyprus University of Technology (CUT), PhD students can participate in several courses offered. LDN aims to design and implement seminars and workshops based on innovative teaching practices, promote the exchange of good teaching practices, contribute to the long-term educational policy of the University, provide continuous support for academic practice, and coordinate and operate new, creative learning spaces at the University (https://ldn.cut.ac.cy/). DCE should specify the minimum number of courses offered by LDN that PhD students should attend per year.
b) The Department organizes a mandatory seminar series that PhD students are required to attend. These seminars aim to equip students with essential knowledge relevant to their research area.

The seminars include academic lectures by external researchers or professors, presentations on statistical packages and professional skills training. Moreover, neither the teaching and research staff nor the PhD students are required to pay additional tuition fees to participate in the seminars.

c) The LDN of CUT organizes a Summer School every year for doctoral students from the 8 Universities participating in the alliance of the European University of Technology (EUt+). The Summer School program includes lectures, discussions, exercises and networking activities delivered in English. The Summer School aims to introduce students to their new role as PhD candidates and provide them with tools to manage projects, research education, work/life balance and collaboration with supervisors. The first-year PhD students of DCE will be encouraged to attend this course.

d) Through research-funded projects, workshops or training schools are organized by faculty members of the Department, providing opportunities for PhD students to attend. For example, the specialized training school "Ecofriendly multipurpose Biobased Products from municipal biowaste" was organized by LIFE EBP (a LIFE+ project focused on the valorization of the organic fraction of municipal solid waste for fertilizer production in agricultural applications https://www.lifeebp.eu/resources/posts/8/Leaflet%20EBP%20A5.pdf) between 13-14 October 2022 in Limassol at the premises of CUT. Moreover, the "An ocean of opportunities" hybrid training school on bridging the gap between applied sciences and commercialization potential with an in-depth workshop on communication and pitching the idea was organized at the premises of CUT, the Cyprus Marine Aquaculture Research Center of the DFMR and the Cyprus Marine and Maritime Institute between 2-6 May 2022. The training school was supported by the COST Action Ocean4Biotech (CA18238), the Junior Achievements Cyprus, the European University of Technology and the XPRO Consulting Limited, Cyprus (see also https://www.cmmi.blue/an-ocean-of-opportunities-hybrid-training-school/).

Student – centred learning, teaching and assessment

(ESG 1.3)

Areas of improvement and recommendations for BSc

Process of teaching and learning and student-centered teaching methodology

Q1) The process of teaching and learning should support students' individual and social development, including the development of national and European identity, social responsibility and active citizenship initiatives for chemical communities/industrial areas of Cyprus. The Head of department could follow the 4 purposes of higher education of the Council of Europe.

Actions Taken by the Institution

AN1) The 4 major purposes for higher education as identified by the Council of Europe are as follows: a) preparation for the labor market, b) preparation for life as active citizens in democratic societies, c) personal development and d) development of a broad and advanced knowledge base. Some of these are actually dealt with at university level, by one of the support groups of LDN (htttp://ldn.cut.ac.cy/el/) in CUT, that offers academic learning support and aims at developing the study and learning skills of students, including doctoral students and researchers, by offering training programmes in teaching and research skills, as well as in skills of writing research proposals.

LDN offers a series of integrated courses (seminars) on topics related to strengthening the knowledge and skills of both postgraduate and doctoral students. A few online seminars delivered over the past 2 years include the following topics: "Doctoral deadlines and selfcare" (this seminar referred to doctoral students and more specifically to the management of challenges arising from PhD studies), "Open discussion on accessibility and inclusion" (Roundtable discussion on issues of accessibility and inclusion in everyday life, student and professional life, virtual and face-to-face), and "Starting my own business: what should I know?" (the aim of the seminar was to explain basic concepts that should be known by students interested in starting their own business).

At departmental level, students also get acquainted with chemical, and other, industries through seminars given as part of courses CEN 407 "Studies and Career Interconnection Seminars I" and CEN 408 "Studies and Career Interconnection Seminars II".

Practical training

Q2) The duration of practical training of students, following discussion with them, could be possibly extended. The University could expand the list of the collaborating industries and companies that accept students for practical training and include also all the working environments in which Chemical Engineers could work in the future (public, private, remote). That would benefit both the students and also the public awareness about the department and the role of Chemical Engineering in society and in the local economy.

Actions Taken by the Institution

AN2) Although it would be desirable to extend the practical training, this is unfortunately difficult to achieve. Practical training starts upon completion of the examination period of the spring semester in early June and it should last between 4-6 weeks. If both the company and the student wish, the duration could be further extended until the end of August prior commencement of the next semester at the beginning of September. However, many companies in Cyprus substantially reduce their activity for approximately 2 weeks in August due to the vacation taken by their staff. This fact restricts

extending the duration of practical training for all students, given that it will be extremely difficult to secure the number of extended placements required to cover all students due to the aforementioned particularity.

DCE frequently updates the list of companies accepting students for practical training and, given that the programme has been active for only 6 years, the current list is increasing every year. Moreover, we would like to thank the committee for the recommendation to add organizations for practical training from the public sector. It should be noted that DCE already has students conducting their practical training in public authorities, such as the Sewerage Board of Limassol-Amathus and Larnaca Sewerage Board. Moreover, DCE has established a preliminary agreement to appoint students to the Cyprus Hydrocarbons Company (CHC), which is the National (State owned) Oil and Gas Company of Cyprus, and the Cyprus Organisation for Standardisation (CYS), which is the national standardisation body of Cyprus.

Areas of improvement and recommendations for PhD

Process of teaching and learning and student-centered teaching methodology

Q3) It would be a benefit for students to be able to take some ECTS-course credits, instead of having to rely on colleagues to learn necessary things, such as the use of MATLAB or similar.

Students are encouraged to take a more active role in creating the learning and research process and in being the future active citizens. Particularly PhD students in collaboration with administration and research officers shall be leaders in making CUT a young leader in Public Learning organizations (e.g. provide classes or mentoring for Chemeng students and public departments though CUT E--learning platform). We also suggest they be involved in making CUT a Research leader within public organizations.

Actions Taken by the Institution

AN3) PhD candidates have the option to enroll and earn credits in two undergraduate courses, as recommended by the Departmental Postgraduate Committee. If they do not possess a Master's degree, they should attend at least eight courses (up to two undergraduate and at least six postgraduate). Currently, students with a Master's degree are not required to take additional university courses, as they are credited with 60 ECTS. However, we acknowledge that there may be instances where PhD students, even those with a Master's degree, may need to acquire new knowledge or skills in order to effectively pursue their research. In these cases, students may, if they wish to, enroll to courses.
PhD students can additionally participate in the seminars offered by the LDN of CUT. Moreover, PhD candidates are obliged to participate in at least one taught laboratory course as Teaching Assistants. However, although DCE commits students for one laboratory course, the vast majority of students participate as Teaching Assistants in several courses.

Q4) The department could discuss ways for increasing the University Ranking through Research programs. First, there could be a better dissemination of ChemEng Research results of European Programs both internally with other departments of CUT and externally with other public Universities in order to make gradually an ecosystem of E-Universities in the Republic of Cyprus.

Actions Taken by the Institution

AN4) To address these suggestions, DCE plans to take the following actions:

a) Empowering PhD Students: DCE recognizes the importance of students taking an active role in shaping their learning experience and becoming future active citizens. The Department will actively collaborate with administration and research officers to provide opportunities for PhD students to lead initiatives, such as offering classes or mentoring programmes for undergraduate Chemical Engineering students and public departments through CUT's E-learning platform. This direction will not only enhance the learning experience, but also contribute to the development of leadership skills among the PhD students involved.
b) Establishing Research Leadership: Building upon the strengths of the Department's research programmes, DCE will work towards increasing the University Ranking through impactful research initiatives. Improved dissemination of Chemical Engineering research results obtained via European programmes will be prioritized, both internally within other Departments of CUT and externally with other public universities. Published papers and dissemination activities from research programmes will be communicated through departmental and university social media platforms.

2. Teaching staff
(ESG 1.5)

Areas of improvement and recommendations for BSc

Q1) Employment of more core-chemical-engineering faculty.

Actions Taken by the Institution

AN1) DCE agrees with the committee that it is essential to employ more faculty members with a first degree in Chemical Engineering. The specific requirement is part of the Strategic Plan of DCE. Towards this direction, DCE expects that two (2) more faculty members will be added in early 2024 and three (3) more by the end of 2025 based on running and planned hiring procedures.

Areas of improvement and recommendations for PhD

Q2) There are not many problems detected during this virtual visit, regarding the teaching staff of PhD programs. We do believe it would be helpful for students, enrolling with an MSc as their basis, to be able to take university courses. Presently students enrolled with an MSc degree are not supposed to do that. However, there can be a need for courses – even at PhD level – when trying to learn something new.

Actions Taken by the Institution

AN2) We would like to thank the committee for the observation that not many problems were detected during the virtual visit regarding the teaching staff in our PhD programme. DCE understands the importance of providing flexibility and opportunities for students holding a Master's degree to further enhance their knowledge and skills through university courses. As mentioned above, PhD candidates have the option to enroll and earn credits in two undergraduate courses, as recommended by the Departmental Postgraduate Committee. If they do not possess a Master's degree, they should attend at least eight courses (up to two undergraduate and at least six postgraduate). PhD students can additionally participate in the seminars offered by the LDN of CUT. Currently, students with a Master's degree are not required to take additional university courses, as they are credited with 60 ECTS. However, we acknowledge that there could be instances where PhD students, even those with a Master's degree, may need to acquire new knowledge or skills in order to effectively pursue their research.

The decision to credit 60 ECTS for students with a Master's degree is determined by the Postgraduate Studies Committee, followed by the approval of the Departmental Board. However, if a supervisor determines that a PhD student lacks the necessary background or expertise in a particular area, they have the option to propose that the student should take one or more courses to support the student. DCE strives to maintain a balance between providing students with the flexibility to pursue their research interests and ensuring they have the necessary skills and knowledge to succeed in their PhD studies. The consideration of additional courses for individual students constitutes a collaborative decision-making process between the student, their supervisor, and the relevant departmental committees.

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

Areas of improvement and recommendations for BSc

Q1) Consider streamlining a process to address cases where students may face difficulty in passing compulsory courses, such as issuing alternative awards (e.g., certificates or diplomas) with lesser requirements.

Actions Taken by the Institution

AN1) Unfortunately, alternative awards cannot be issued based on University regulations. To the best of our knowledge, public universities in Cyprus cannot issue alternative awards to accommodate cases where students face difficulty in passing specific compulsory courses.

Areas of improvement and recommendations for PhD

No specific areas of improvement identified.

4. Learning resources and student support
(ESG 1.6)

Areas of improvement and recommendations for BSc
Q1) A more integrated campus would be desirable.

Actions Taken by the Institution
AN1) DCE fully agrees that a more integrated campus would be desirable. To address this issue, the Department actively communicates and expresses its needs for a more integrated campus to the authorities of the University through the Dean of the faculty, where DCE highlights the benefits of creating spaces and initiatives that facilitate interdisciplinary interactions, shared resources and collaborative opportunities among different departments and disciplines.

Based on the University's Strategic Plan DCE is expected to move to a new building in Veregaria area situated outside the city center of Limassol. However, the specific plan requires several years to materialize and until then DCE will be confined within the dispersed premises currently available in the main campus of CUT in the center of Limassol.

Areas of improvement and recommendations for PhD
Q2) A more integrated campus would be desirable.

Actions Taken by the Institution
AN2) Please see our response in AN1 above.

5. Additional for doctoral programmes
(ALL ESG)

Areas of improvement and recommendations
Q1) The final assessment of PhD thesis may enhance the involvement of subject experts from recognized external research environments.

Actions Taken by the Institution
AN1) According to the University's regulations, external members of the PhD dissertation Examination Committee must possess expertise relevant to the subject of the dissertation. Additionally, it is essential to avoid any conflict of interest between the student and external evaluators. Therefore, each member of the Examination Committee, apart from the Research Advisor, is required to submit a statement declaring any potential conflict of interest. The composition of the examination committee, including a declaration of the relevance of the research expertise of each member to the topic of the PhD Thesis, is approved first by the Departmental Board followed by the Faculty Board. To ensure that the members of the Examination Committee are indeed experts in the topic of the PhD Thesis, the research advisor should document their qualifications and expertise. This documentation should be presented in a comprehensive manner to the Departmental Board, providing detailed information about the external members' backgrounds and areas of specialization.
Thus, although University regulations already require the involvement of external subject experts in the PhD Examination Committee, the Department will further promote the inclusion of experts from recognized research environments to enhance the quality of the programme.

7. Eligibility (Joint programme)

(ALL ESG)

N/A

Areas of improvement and recommendations **by EEC**	Actions Taken by the Institution	For Official Use ONLY
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Click or tap here to enter text.	Click or tap here to enter text.	Choose level of compliance:

B. Conclusions and final remarks

Recommendations:

• Q1) Recruitment of more faculty with core-chemical-engineering competences
• Q2) Better integration of facilities within the same (or closely situated) buildings
• Q3) There seems not to be much consciousness among students about representation and how to exert influence on programs, this makes the students an under-utilized resource in the development of the programs
• Q4) Somewhat more emphasis on practical operation of chemical engineering processing systems at intermediate to larger scale
• Q5) Develop access to practical experiences with larger scale processing equipment. Internships may help with this, but then internships must not reduce to analytical work only

Actions Taken by the Institution

• AN1) DCE anticipates that two (2) more faculty members will be recruited in early 2024 and three (3) more by the end of 2025.
• AN2) DCE is expected to move to a new building in Veregaria area (outside the city center of Limassol) as specified in the Strategic Plan of CUT.
• AN3) Students can bring up issues through the three (3) student representatives in the Departmental Board. Subsequently, the Departmental Undergraduate Studies Committee, which oversees handling of various tasks related to Undergraduate studies and the curriculum, is responsible to either directly resolve the issues raised by students or to inform the Departmental Board aiming to seek for optimal solutions.
• AN4+5) Currently students participate in one (1) laboratory practical experience at the IESC Innovating Environmental Solutions Center Ltd (http://www.iesc-ltd.com/) which is located in Ypsonas in Limassol as part of the laboratory exercises which are included in the course CEN 302 “Chemical Technology Laboratory”. DCE will supplement the specific course with an additional laboratory exercise that will be conducted at a relevant industry. A very small number of Internships covering analytical work only will be eliminated.

C. Higher Education Institution academic representatives

Name	*Position*	*Signature*
Michalis Koutinas	Department Chair	
Alexandros Charalambides	Program Coordinator	
Ioannis Vyrides	Postgraduate Studies Committee	
Pavlos Stefanou	Undergraduate Studies Committee	Παύλος Στεφάνου
Achilleas Konstantinou	Undergraduate Studies Committee	Αχιλλέας Κωνσταντίνου
Click to enter Name	Click to enter Position	

Date: 10/8/2023

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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)**

Programme 1 – BSc

In Greek:

Προπτυχιακό Πρόγραμμα στη Χημική Μηχανική (4 έτη, 240 ECTS)

In English:

Undergraduate Programme in Chemical Engineering (4 years, 240 ECTS

Language(s) of instruction: Greek

Programme 2 – PhD[Title 2]

In Greek:

Διδακτορικό Πρόγραμμα στη Χημική Μηχανική και Περιβαλλοντική Τεχνολογία (3 έτη, 240 ECTS)

In English:

PhD Programme in Chemical Engineering and Environmental Technology (3 years, 240 ECTS)

Language(s) of instruction: Greek

- **Programme's status:** Choose Status
- **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

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

Areas of improvement and recommendations for BSc

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Actions Taken by the Institution

AN1) Such involvement of external stakeholders has already been done to a certain extent. For example, we have stated that several laboratory exercises are conducted or are planned to be conducted at different industries where employees provide their knowledge to the students. Specifically, the students of CEN 302 "Chemical Technology Laboratory" conduct a lab exercise at the Innovating Environmental Solutions Center (IESC Ltd) located in Limassol. The Department aims to further strengthen the programme by providing an additional lab exercise of CEN 302 at the premises of a relevant industry. Moreover, the practical training course (CEN 309) takes place in the industry, while the Department organizes several events (e.g. invited talks from the industry and public sector, workshops, practical training courses/sessions) with the participation of various stakeholders. These actions will be further extended over the next few years.

Q2) Increase the frequency of course and program reviews, considering an annual or biennial cycle to ensure ongoing improvement. Given the program's relative newness, the recent completion of a program review cycle is unclear.

Actions Taken by the Institution

AN2) The program is revised constantly by the Departmental Undergraduate Studies Committee (USC). The specific committee is responsible for constantly monitoring the programme, taking action to propose solutions when problems arise as well as to inform the Departmental Board about cases that cannot be independently solved by USC. An annual review of the programme will be targeted, between the USC and student representatives.

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Actions Taken by the Institution

AN3) a) We have conducted a complete review of the curriculum and we have indeed identified a few cases of repetition. An important case is the introduction of students to mass and energy balances in CEN 111 "Introduction to Chemical Engineering", which are also taught in more detail during CEN 206 "Mass and Energy Balance". However, it should be noted that the introduction in CEN 111 constitutes only an introductory course, which is needed to cover the rest of the material. Thus, the description of the specific course has been modified aiming to clarify that the teaching of

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d) Regarding process and lab safety issues, such topics are always covered during the introductory lecture in every laboratory course. Based on the comment of the committee, the specific topic has been now included in the introductory course CEN 100 "Professional Skills for Chemical Engineers" of the first semester (see Annex I for the revised description).

e) Aiming to add further computational courses, we need to remove courses already included in the curriculum. As discussed during the meeting, the objective here is to remove non-essential Engineering courses such as CEN 213 "Engineering Mechanics" and CEN 306 "Electrical Circuits" and replace them with new computational courses. Given that both courses that should be removed comprise a suggestion, since the establishment of the Chemical Engineering programme of CUT, by the Cyprus Scientific and Technical Chamber (CSTC), prior their removal from the curriculum the specific change should be first confirmed with CSTC. However, we have enriched in the meantime

the description of CEN 301 "Dynamic Simulation with the Use of Computers" (see Annex I for the revised description).

Areas of improvement and recommendations for PhD

Q4) Consider enhancing the involvement of subject experts from recognized research environments in the evaluation committee for theses.

Actions Taken by the Institution

AN4) According to the University's regulations, external members of the PhD dissertation Examination Committee must possess expertise relevant to the subject of the dissertation and comply with specified regulations. Additionally, it is essential to avoid any conflict of interest between the student and external evaluators. Therefore, each member of the Examination Committee, apart from the Research Advisor, is required to submit a statement declaring any potential conflict of interest. The composition of the examination committee, including a declaration of the relevance of the research expertise of each member to the topic of the PhD Thesis, is approved first by the Departmental Board followed by the Faculty Board. To ensure that the members of the Examination Committee are indeed experts in the topic of the PhD Thesis, the research advisor should document their qualifications and expertise. This documentation should be presented in a comprehensive manner to the Departmental Board, providing detailed information about the external members' backgrounds and areas of specialization. According to University's regulations, at least one external examiner (coming from a different University or Institution) should be included in the external committee, while the additional examiner of the committee could be either an internal or external faculty member. Thus, although University regulations already require the involvement of external subject experts in the PhD Examination Committee, the Department will further promote the inclusion of experts from recognized research environments to enhance the quality of the programme.

Q5) Offer optional short courses in research methods, programming, career planning, project management, and other relevant areas to all PhD students, tailoring recommendations to individual students' needs.

Actions Taken by the Institution

AN5) The Department of Chemical Engineering (DCE) has implemented several strategies and will implement even more if necessary to enhance the learning experiences of its PhD students. The following points outline the initiatives and resources offered by the Department:

a) Through the Learning Development Network (LDN) of Cyprus University of Technology (CUT), PhD students can participate in several courses offered. LDN aims to design and implement seminars and workshops based on innovative teaching practices, promote the exchange of good teaching practices, contribute to the long-term educational policy of the University, provide continuous support for academic practice, and coordinate and operate new, creative learning spaces at the University (https://ldn.cut.ac.cy/). DCE should specify the minimum number of courses offered by LDN that PhD students should attend per year.
b) The Department organizes a mandatory seminar series that PhD students are required to attend. These seminars aim to equip students with essential knowledge relevant to their research area.

The seminars include academic lectures by external researchers or professors, presentations on statistical packages and professional skills training. Moreover, neither the teaching and research staff nor the PhD students are required to pay additional tuition fees to participate in the seminars.

c) The LDN of CUT organizes a Summer School every year for doctoral students from the 8 Universities participating in the alliance of the European University of Technology (EUt+). The Summer School program includes lectures, discussions, exercises and networking activities delivered in English. The Summer School aims to introduce students to their new role as PhD candidates and provide them with tools to manage projects, research education, work/life balance and collaboration with supervisors. The first-year PhD students of DCE will be encouraged to attend this course.

d) Through research-funded projects, workshops or training schools are organized by faculty members of the Department, providing opportunities for PhD students to attend. For example, the specialized training school "Ecofriendly multipurpose Biobased Products from municipal biowaste" was organized by LIFE EBP (a LIFE+ project focused on the valorization of the organic fraction of municipal solid waste for fertilizer production in agricultural applications https://www.lifeebp.eu/resources/posts/8/Leaflet%20EBP%20A5.pdf) between 13-14 October 2022 in Limassol at the premises of CUT. Moreover, the "An ocean of opportunities" hybrid training school on bridging the gap between applied sciences and commercialization potential with an in-depth workshop on communication and pitching the idea was organized at the premises of CUT, the Cyprus Marine Aquaculture Research Center of the DFMR and the Cyprus Marine and Maritime Institute between 2-6 May 2022. The training school was supported by the COST Action Ocean4Biotech (CA18238), the Junior Achievements Cyprus, the European University of Technology and the XPRO Consulting Limited, Cyprus (see also https://www.cmmi.blue/an-ocean-of-opportunities-hybrid-training-school/).

Student – centred learning, teaching and assessment

(ESG 1.3)

Areas of improvement and recommendations for BSc

Process of teaching and learning and student-centered teaching methodology

Q1) The process of teaching and learning should support students' individual and social development, including the development of national and European identity, social responsibility and active citizenship initiatives for chemical communities/industrial areas of Cyprus. The Head of department could follow the 4 purposes of higher education of the Council of Europe.

Actions Taken by the Institution

AN1) The 4 major purposes for higher education as identified by the Council of Europe are as follows: a) preparation for the labor market, b) preparation for life as active citizens in democratic societies, c) personal development and d) development of a broad and advanced knowledge base. Some of these are actually dealt with at university level, by one of the support groups of LDN (htttp://ldn.cut.ac.cy/el/) in CUT, that offers academic learning support and aims at developing the study and learning skills of students, including doctoral students and researchers, by offering training programmes in teaching and research skills, as well as in skills of writing research proposals.

LDN offers a series of integrated courses (seminars) on topics related to strengthening the knowledge and skills of both postgraduate and doctoral students. A few online seminars delivered over the past 2 years include the following topics: "Doctoral deadlines and selfcare" (this seminar referred to doctoral students and more specifically to the management of challenges arising from PhD studies), "Open discussion on accessibility and inclusion" (Roundtable discussion on issues of accessibility and inclusion in everyday life, student and professional life, virtual and face-to-face), and "Starting my own business: what should I know?" (the aim of the seminar was to explain basic concepts that should be known by students interested in starting their own business).

At departmental level, students also get acquainted with chemical, and other, industries through seminars given as part of courses CEN 407 "Studies and Career Interconnection Seminars I" and CEN 408 "Studies and Career Interconnection Seminars II".

Practical training

Q2) The duration of practical training of students, following discussion with them, could be possibly extended. The University could expand the list of the collaborating industries and companies that accept students for practical training and include also all the working environments in which Chemical Engineers could work in the future (public, private, remote). That would benefit both the students and also the public awareness about the department and the role of Chemical Engineering in society and in the local economy.

Actions Taken by the Institution

AN2) Although it would be desirable to extend the practical training, this is unfortunately difficult to achieve. Practical training starts upon completion of the examination period of the spring semester in early June and it should last between 4-6 weeks. If both the company and the student wish, the duration could be further extended until the end of August prior commencement of the next semester at the beginning of September. However, many companies in Cyprus substantially reduce their activity for approximately 2 weeks in August due to the vacation taken by their staff. This fact restricts

extending the duration of practical training for all students, given that it will be extremely difficult to secure the number of extended placements required to cover all students due to the aforementioned particularity.

DCE frequently updates the list of companies accepting students for practical training and, given that the programme has been active for only 6 years, the current list is increasing every year. Moreover, we would like to thank the committee for the recommendation to add organizations for practical training from the public sector. It should be noted that DCE already has students conducting their practical training in public authorities, such as the Sewerage Board of Limassol-Amathus and Larnaca Sewerage Board. Moreover, DCE has established a preliminary agreement to appoint students to the Cyprus Hydrocarbons Company (CHC), which is the National (State owned) Oil and Gas Company of Cyprus, and the Cyprus Organisation for Standardisation (CYS), which is the national standardisation body of Cyprus.

Areas of improvement and recommendations for PhD

Process of teaching and learning and student-centered teaching methodology

Q3) It would be a benefit for students to be able to take some ECTS-course credits, instead of having to rely on colleagues to learn necessary things, such as the use of MATLAB or similar.

Students are encouraged to take a more active role in creating the learning and research process and in being the future active citizens. Particularly PhD students in collaboration with administration and research officers shall be leaders in making CUT a young leader in Public Learning organizations (e.g. provide classes or mentoring for Chemeng students and public departments though CUT E--learning platform). We also suggest they be involved in making CUT a Research leader within public organizations.

Actions Taken by the Institution

AN3) PhD candidates have the option to enroll and earn credits in two undergraduate courses, as recommended by the Departmental Postgraduate Committee. If they do not possess a Master's degree, they should attend at least eight courses (up to two undergraduate and at least six postgraduate). Currently, students with a Master's degree are not required to take additional university courses, as they are credited with 60 ECTS. However, we acknowledge that there may be instances where PhD students, even those with a Master's degree, may need to acquire new knowledge or skills in order to effectively pursue their research. In these cases, students may, if they wish to, enroll to courses.
PhD students can additionally participate in the seminars offered by the LDN of CUT. Moreover, PhD candidates are obliged to participate in at least one taught laboratory course as Teaching Assistants. However, although DCE commits students for one laboratory course, the vast majority of students participate as Teaching Assistants in several courses.

Q4) The department could discuss ways for increasing the University Ranking through Research programs. First, there could be a better dissemination of ChemEng Research results of European Programs both internally with other departments of CUT and externally with other public Universities in order to make gradually an ecosystem of E-Universities in the Republic of Cyprus.

Actions Taken by the Institution

AN4) To address these suggestions, DCE plans to take the following actions:

a) Empowering PhD Students: DCE recognizes the importance of students taking an active role in shaping their learning experience and becoming future active citizens. The Department will actively collaborate with administration and research officers to provide opportunities for PhD students to lead initiatives, such as offering classes or mentoring programmes for undergraduate Chemical Engineering students and public departments through CUT's E-learning platform. This direction will not only enhance the learning experience, but also contribute to the development of leadership skills among the PhD students involved.
b) Establishing Research Leadership: Building upon the strengths of the Department's research programmes, DCE will work towards increasing the University Ranking through impactful research initiatives. Improved dissemination of Chemical Engineering research results obtained via European programmes will be prioritized, both internally within other Departments of CUT and externally with other public universities. Published papers and dissemination activities from research programmes will be communicated through departmental and university social media platforms.

2. Teaching staff
(ESG 1.5)

Areas of improvement and recommendations for BSc

Q1) Employment of more core-chemical-engineering faculty.

Actions Taken by the Institution

AN1) DCE agrees with the committee that it is essential to employ more faculty members with a first degree in Chemical Engineering. The specific requirement is part of the Strategic Plan of DCE. Towards this direction, DCE expects that two (2) more faculty members will be added in early 2024 and three (3) more by the end of 2025 based on running and planned hiring procedures.

Areas of improvement and recommendations for PhD

Q2) There are not many problems detected during this virtual visit, regarding the teaching staff of PhD programs. We do believe it would be helpful for students, enrolling with an MSc as their basis, to be able to take university courses. Presently students enrolled with an MSc degree are not supposed to do that. However, there can be a need for courses – even at PhD level – when trying to learn something new.

Actions Taken by the Institution

AN2) We would like to thank the committee for the observation that not many problems were detected during the virtual visit regarding the teaching staff in our PhD programme. DCE understands the importance of providing flexibility and opportunities for students holding a Master's degree to further enhance their knowledge and skills through university courses. As mentioned above, PhD candidates have the option to enroll and earn credits in two undergraduate courses, as recommended by the Departmental Postgraduate Committee. If they do not possess a Master's degree, they should attend at least eight courses (up to two undergraduate and at least six postgraduate). PhD students can additionally participate in the seminars offered by the LDN of CUT. Currently, students with a Master's degree are not required to take additional university courses, as they are credited with 60 ECTS. However, we acknowledge that there could be instances where PhD students, even those with a Master's degree, may need to acquire new knowledge or skills in order to effectively pursue their research.

The decision to credit 60 ECTS for students with a Master's degree is determined by the Postgraduate Studies Committee, followed by the approval of the Departmental Board. However, if a supervisor determines that a PhD student lacks the necessary background or expertise in a particular area, they have the option to propose that the student should take one or more courses to support the student. DCE strives to maintain a balance between providing students with the flexibility to pursue their research interests and ensuring they have the necessary skills and knowledge to succeed in their PhD studies. The consideration of additional courses for individual students constitutes a collaborative decision-making process between the student, their supervisor, and the relevant departmental committees.

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

Areas of improvement and recommendations for BSc

Q1) Consider streamlining a process to address cases where students may face difficulty in passing compulsory courses, such as issuing alternative awards (e.g., certificates or diplomas) with lesser requirements.

Actions Taken by the Institution

AN1) Unfortunately, alternative awards cannot be issued based on University regulations. To the best of our knowledge, public universities in Cyprus cannot issue alternative awards to accommodate cases where students face difficulty in passing specific compulsory courses.

Areas of improvement and recommendations for PhD

No specific areas of improvement identified.

4. Learning resources and student support
(ESG 1.6)

Areas of improvement and recommendations for BSc
Q1) A more integrated campus would be desirable.

Actions Taken by the Institution
AN1) DCE fully agrees that a more integrated campus would be desirable. To address this issue, the Department actively communicates and expresses its needs for a more integrated campus to the authorities of the University through the Dean of the faculty, where DCE highlights the benefits of creating spaces and initiatives that facilitate interdisciplinary interactions, shared resources and collaborative opportunities among different departments and disciplines.

Based on the University's Strategic Plan DCE is expected to move to a new building in Veregaria area situated outside the city center of Limassol. However, the specific plan requires several years to materialize and until then DCE will be confined within the dispersed premises currently available in the main campus of CUT in the center of Limassol.

Areas of improvement and recommendations for PhD
Q2) A more integrated campus would be desirable.

Actions Taken by the Institution
AN2) Please see our response in AN1 above.

5. Additional for doctoral programmes
(ALL ESG)

Areas of improvement and recommendations
Q1) The final assessment of PhD thesis may enhance the involvement of subject experts from recognized external research environments.

Actions Taken by the Institution
AN1) According to the University's regulations, external members of the PhD dissertation Examination Committee must possess expertise relevant to the subject of the dissertation. Additionally, it is essential to avoid any conflict of interest between the student and external evaluators. Therefore, each member of the Examination Committee, apart from the Research Advisor, is required to submit a statement declaring any potential conflict of interest. The composition of the examination committee, including a declaration of the relevance of the research expertise of each member to the topic of the PhD Thesis, is approved first by the Departmental Board followed by the Faculty Board. To ensure that the members of the Examination Committee are indeed experts in the topic of the PhD Thesis, the research advisor should document their qualifications and expertise. This documentation should be presented in a comprehensive manner to the Departmental Board, providing detailed information about the external members' backgrounds and areas of specialization.
Thus, although University regulations already require the involvement of external subject experts in the PhD Examination Committee, the Department will further promote the inclusion of experts from recognized research environments to enhance the quality of the programme.

7. Eligibility (Joint programme)

(ALL ESG)

N/A

Areas of improvement and recommendations **by EEC**	Actions Taken by the Institution	For Official Use ONLY
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Click or tap here to enter text.	Click or tap here to enter text.	Choose level of compliance:

B. Conclusions and final remarks

Recommendations:

• Q1) Recruitment of more faculty with core-chemical-engineering competences
• Q2) Better integration of facilities within the same (or closely situated) buildings
• Q3) There seems not to be much consciousness among students about representation and how to exert influence on programs, this makes the students an under-utilized resource in the development of the programs
• Q4) Somewhat more emphasis on practical operation of chemical engineering processing systems at intermediate to larger scale
• Q5) Develop access to practical experiences with larger scale processing equipment. Internships may help with this, but then internships must not reduce to analytical work only

Actions Taken by the Institution

• AN1) DCE anticipates that two (2) more faculty members will be recruited in early 2024 and three (3) more by the end of 2025.
• AN2) DCE is expected to move to a new building in Veregaria area (outside the city center of Limassol) as specified in the Strategic Plan of CUT.
• AN3) Students can bring up issues through the three (3) student representatives in the Departmental Board. Subsequently, the Departmental Undergraduate Studies Committee, which oversees handling of various tasks related to Undergraduate studies and the curriculum, is responsible to either directly resolve the issues raised by students or to inform the Departmental Board aiming to seek for optimal solutions.
• AN4+5) Currently students participate in one (1) laboratory practical experience at the IESC Innovating Environmental Solutions Center Ltd (http://www.iesc-ltd.com/) which is located in Ypsonas in Limassol as part of the laboratory exercises which are included in the course CEN 302 “Chemical Technology Laboratory”. DCE will supplement the specific course with an additional laboratory exercise that will be conducted at a relevant industry. A very small number of Internships covering analytical work only will be eliminated.

C. Higher Education Institution academic representatives

Name	*Position*	*Signature*
Michalis Koutinas	Department Chair	
Alexandros Charalambides	Program Coordinator	
Ioannis Vyrides	Postgraduate Studies Committee	
Pavlos Stefanou	Undergraduate Studies Committee	Παύλος Στεφάνου
Achilleas Konstantinou	Undergraduate Studies Committee	Αχιλλέας Κωνσταντίνου
Click to enter Name	Click to enter Position	

Date: 10/8/2023

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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)**

Programme 1 – BSc

In Greek:

Προπτυχιακό Πρόγραμμα στη Χημική Μηχανική (4 έτη, 240 ECTS)

In English:

Undergraduate Programme in Chemical Engineering (4 years, 240 ECTS

Language(s) of instruction: Greek

Programme 2 – PhD[Title 2]

In Greek:

Διδακτορικό Πρόγραμμα στη Χημική Μηχανική και Περιβαλλοντική Τεχνολογία (3 έτη, 240 ECTS)

In English:

PhD Programme in Chemical Engineering and Environmental Technology (3 years, 240 ECTS)

Language(s) of instruction: Greek

- **Programme's status:** Choose Status
- **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 300.1.1/1 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. The answers' documentation should be brief and accurate and supported by the relevant documentation. Referral to annexes should be made only when necessary.*

- *In particular, under each assessment area and by using the 2nd column of each table, the HEI must respond on the following:*

  - *the areas of improvement and recommendations of the EEC*
  - *the conclusions and final remarks noted by the EEC*

- *The institution should respond to the EEC comments, in the designated area next each comment. The comments of the EEC should be copied from the EEC report **without any interference** in the content.*

- *In case of annexes, those should be attached and sent on separate document(s). Each document should be in *.pdf format and named as annex1, annex2, etc.*

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

Areas of improvement and recommendations for BSc

Q1) Enhance the involvement of external stakeholders, including employers, industrial practitioners, and subject experts from other institutions, especially those in recognized research environments.

Actions Taken by the Institution

AN1) Such involvement of external stakeholders has already been done to a certain extent. For example, we have stated that several laboratory exercises are conducted or are planned to be conducted at different industries where employees provide their knowledge to the students. Specifically, the students of CEN 302 "Chemical Technology Laboratory" conduct a lab exercise at the Innovating Environmental Solutions Center (IESC Ltd) located in Limassol. The Department aims to further strengthen the programme by providing an additional lab exercise of CEN 302 at the premises of a relevant industry. Moreover, the practical training course (CEN 309) takes place in the industry, while the Department organizes several events (e.g. invited talks from the industry and public sector, workshops, practical training courses/sessions) with the participation of various stakeholders. These actions will be further extended over the next few years.

Q2) Increase the frequency of course and program reviews, considering an annual or biennial cycle to ensure ongoing improvement. Given the program's relative newness, the recent completion of a program review cycle is unclear.

Actions Taken by the Institution

AN2) The program is revised constantly by the Departmental Undergraduate Studies Committee (USC). The specific committee is responsible for constantly monitoring the programme, taking action to propose solutions when problems arise as well as to inform the Departmental Board about cases that cannot be independently solved by USC. An annual review of the programme will be targeted, between the USC and student representatives.

Q3) Conduct a top-down review of the program to course level to address repetitions, and include topics such as computer applications, programming, artificial intelligence and machine learning, engineering thermodynamics, sustainability and ethics, process safety, group design, and teamwork throughout the curriculum.

Actions Taken by the Institution

AN3) a) We have conducted a complete review of the curriculum and we have indeed identified a few cases of repetition. An important case is the introduction of students to mass and energy balances in CEN 111 "Introduction to Chemical Engineering", which are also taught in more detail during CEN 206 "Mass and Energy Balance". However, it should be noted that the introduction in CEN 111 constitutes only an introductory course, which is needed to cover the rest of the material. Thus, the description of the specific course has been modified aiming to clarify that the teaching of

mass and energy balances in CEN 111 consists only introductory material. Moreover, in CEN 204 "Applied Thermodynamics I" students are taught chemical kinetics, which is additionally taught in CEN 210 "Chemical Reaction Engineering". Since chemical kinetics, as pointed out by the EEC, is not relevant content to a thermodynamics course, we have removed the specific material from the description of CEN 204 and thermodynamics content has been added instead. The revised course descriptions are provided in Annex 1.

b) Aiming to introduce students to Aspen Hysys simulations prior teaching of CEN 311, based on a point raised by the EEC during the meeting with the teaching staff on May 26th 2023, a few simple simulations in the Unit operations courses (CEN 209 "Unit Operations I" and CEN 327 "Unit Operations II") as well as CEN 307 "Chemical Reactor Design and Installation" will be included. For example, during an additional tutorial of CEN 209 students could be instructed on the use of simple modules of Hysys and perform the simulation of a pump and a heat exchanger operation to meet specific conditions (e.g. calculation of the cold fluid flow rate to reach a prespecified exit temperature of the hot fluid). Similarly, during CEN 327 students could simulate the distillation process of a multi-component mixture and of an adsorption column, while in CEN 307 the non-isothermal operation of chemical reactors (which usually cannot be solved analytically) could be simulated. In the same courses (CEN 209, CEN 307 and CEN 327), it has been clarified that the project given to students is computational using Matlab and performed in groups. The revised descriptions of the aforementioned courses are also provided in Annex I.

c) The content of CEN 305 has been almost completely revised to introduce additional engineering thermodynamics material. We have also decided to convert the Environmental Chemical Engineering Specialization module CEN 321 "Wastewater and Liquid Waste Treatment Technologies" into a core module given its high importance to Chemical Engineers. Furthermore, the content of the course has been modified to cover more sustainability issues as per the Committee's suggestion. The revised description is available in Annex 1. Based on this change, one module from the Petrochemical Engineering Specialization should be removed. We have selected CEN 329 "Detection and Utilization of Hydrocarbon Reservoirs" which is the course least related to Chemical Engineering. However, given that the modified curriculum will be applicable to students enrolling in September 2023, the specific change will be implemented after 2 years (the inclusion of more sustainability related content will be applied immediately though). The revised course descriptions of both CEN 305 and CEN 321 are also provided in Annex I.

d) Regarding process and lab safety issues, such topics are always covered during the introductory lecture in every laboratory course. Based on the comment of the committee, the specific topic has been now included in the introductory course CEN 100 "Professional Skills for Chemical Engineers" of the first semester (see Annex I for the revised description).

e) Aiming to add further computational courses, we need to remove courses already included in the curriculum. As discussed during the meeting, the objective here is to remove non-essential Engineering courses such as CEN 213 "Engineering Mechanics" and CEN 306 "Electrical Circuits" and replace them with new computational courses. Given that both courses that should be removed comprise a suggestion, since the establishment of the Chemical Engineering programme of CUT, by the Cyprus Scientific and Technical Chamber (CSTC), prior their removal from the curriculum the specific change should be first confirmed with CSTC. However, we have enriched in the meantime

the description of CEN 301 "Dynamic Simulation with the Use of Computers" (see Annex I for the revised description).

Areas of improvement and recommendations for PhD

Q4) Consider enhancing the involvement of subject experts from recognized research environments in the evaluation committee for theses.

Actions Taken by the Institution

AN4) According to the University's regulations, external members of the PhD dissertation Examination Committee must possess expertise relevant to the subject of the dissertation and comply with specified regulations. Additionally, it is essential to avoid any conflict of interest between the student and external evaluators. Therefore, each member of the Examination Committee, apart from the Research Advisor, is required to submit a statement declaring any potential conflict of interest. The composition of the examination committee, including a declaration of the relevance of the research expertise of each member to the topic of the PhD Thesis, is approved first by the Departmental Board followed by the Faculty Board. To ensure that the members of the Examination Committee are indeed experts in the topic of the PhD Thesis, the research advisor should document their qualifications and expertise. This documentation should be presented in a comprehensive manner to the Departmental Board, providing detailed information about the external members' backgrounds and areas of specialization. According to University's regulations, at least one external examiner (coming from a different University or Institution) should be included in the external committee, while the additional examiner of the committee could be either an internal or external faculty member. Thus, although University regulations already require the involvement of external subject experts in the PhD Examination Committee, the Department will further promote the inclusion of experts from recognized research environments to enhance the quality of the programme.

Q5) Offer optional short courses in research methods, programming, career planning, project management, and other relevant areas to all PhD students, tailoring recommendations to individual students' needs.

Actions Taken by the Institution

AN5) The Department of Chemical Engineering (DCE) has implemented several strategies and will implement even more if necessary to enhance the learning experiences of its PhD students. The following points outline the initiatives and resources offered by the Department:

a) Through the Learning Development Network (LDN) of Cyprus University of Technology (CUT), PhD students can participate in several courses offered. LDN aims to design and implement seminars and workshops based on innovative teaching practices, promote the exchange of good teaching practices, contribute to the long-term educational policy of the University, provide continuous support for academic practice, and coordinate and operate new, creative learning spaces at the University (https://ldn.cut.ac.cy/). DCE should specify the minimum number of courses offered by LDN that PhD students should attend per year.
b) The Department organizes a mandatory seminar series that PhD students are required to attend. These seminars aim to equip students with essential knowledge relevant to their research area.

The seminars include academic lectures by external researchers or professors, presentations on statistical packages and professional skills training. Moreover, neither the teaching and research staff nor the PhD students are required to pay additional tuition fees to participate in the seminars.

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d) Through research-funded projects, workshops or training schools are organized by faculty members of the Department, providing opportunities for PhD students to attend. For example, the specialized training school "Ecofriendly multipurpose Biobased Products from municipal biowaste" was organized by LIFE EBP (a LIFE+ project focused on the valorization of the organic fraction of municipal solid waste for fertilizer production in agricultural applications https://www.lifeebp.eu/resources/posts/8/Leaflet%20EBP%20A5.pdf) between 13-14 October 2022 in Limassol at the premises of CUT. Moreover, the "An ocean of opportunities" hybrid training school on bridging the gap between applied sciences and commercialization potential with an in-depth workshop on communication and pitching the idea was organized at the premises of CUT, the Cyprus Marine Aquaculture Research Center of the DFMR and the Cyprus Marine and Maritime Institute between 2-6 May 2022. The training school was supported by the COST Action Ocean4Biotech (CA18238), the Junior Achievements Cyprus, the European University of Technology and the XPRO Consulting Limited, Cyprus (see also https://www.cmmi.blue/an-ocean-of-opportunities-hybrid-training-school/).

Student – centred learning, teaching and assessment

(ESG 1.3)

Areas of improvement and recommendations for BSc

Process of teaching and learning and student-centered teaching methodology

Q1) The process of teaching and learning should support students' individual and social development, including the development of national and European identity, social responsibility and active citizenship initiatives for chemical communities/industrial areas of Cyprus. The Head of department could follow the 4 purposes of higher education of the Council of Europe.

Actions Taken by the Institution

AN1) The 4 major purposes for higher education as identified by the Council of Europe are as follows: a) preparation for the labor market, b) preparation for life as active citizens in democratic societies, c) personal development and d) development of a broad and advanced knowledge base. Some of these are actually dealt with at university level, by one of the support groups of LDN (htttp://ldn.cut.ac.cy/el/) in CUT, that offers academic learning support and aims at developing the study and learning skills of students, including doctoral students and researchers, by offering training programmes in teaching and research skills, as well as in skills of writing research proposals.

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At departmental level, students also get acquainted with chemical, and other, industries through seminars given as part of courses CEN 407 "Studies and Career Interconnection Seminars I" and CEN 408 "Studies and Career Interconnection Seminars II".

Practical training

Q2) The duration of practical training of students, following discussion with them, could be possibly extended. The University could expand the list of the collaborating industries and companies that accept students for practical training and include also all the working environments in which Chemical Engineers could work in the future (public, private, remote). That would benefit both the students and also the public awareness about the department and the role of Chemical Engineering in society and in the local economy.

Actions Taken by the Institution

AN2) Although it would be desirable to extend the practical training, this is unfortunately difficult to achieve. Practical training starts upon completion of the examination period of the spring semester in early June and it should last between 4-6 weeks. If both the company and the student wish, the duration could be further extended until the end of August prior commencement of the next semester at the beginning of September. However, many companies in Cyprus substantially reduce their activity for approximately 2 weeks in August due to the vacation taken by their staff. This fact restricts

extending the duration of practical training for all students, given that it will be extremely difficult to secure the number of extended placements required to cover all students due to the aforementioned particularity.

DCE frequently updates the list of companies accepting students for practical training and, given that the programme has been active for only 6 years, the current list is increasing every year. Moreover, we would like to thank the committee for the recommendation to add organizations for practical training from the public sector. It should be noted that DCE already has students conducting their practical training in public authorities, such as the Sewerage Board of Limassol-Amathus and Larnaca Sewerage Board. Moreover, DCE has established a preliminary agreement to appoint students to the Cyprus Hydrocarbons Company (CHC), which is the National (State owned) Oil and Gas Company of Cyprus, and the Cyprus Organisation for Standardisation (CYS), which is the national standardisation body of Cyprus.

Areas of improvement and recommendations for PhD

Process of teaching and learning and student-centered teaching methodology

Q3) It would be a benefit for students to be able to take some ECTS-course credits, instead of having to rely on colleagues to learn necessary things, such as the use of MATLAB or similar.

Students are encouraged to take a more active role in creating the learning and research process and in being the future active citizens. Particularly PhD students in collaboration with administration and research officers shall be leaders in making CUT a young leader in Public Learning organizations (e.g. provide classes or mentoring for Chemeng students and public departments though CUT E--learning platform). We also suggest they be involved in making CUT a Research leader within public organizations.

Actions Taken by the Institution

AN3) PhD candidates have the option to enroll and earn credits in two undergraduate courses, as recommended by the Departmental Postgraduate Committee. If they do not possess a Master's degree, they should attend at least eight courses (up to two undergraduate and at least six postgraduate). Currently, students with a Master's degree are not required to take additional university courses, as they are credited with 60 ECTS. However, we acknowledge that there may be instances where PhD students, even those with a Master's degree, may need to acquire new knowledge or skills in order to effectively pursue their research. In these cases, students may, if they wish to, enroll to courses.
PhD students can additionally participate in the seminars offered by the LDN of CUT. Moreover, PhD candidates are obliged to participate in at least one taught laboratory course as Teaching Assistants. However, although DCE commits students for one laboratory course, the vast majority of students participate as Teaching Assistants in several courses.

Q4) The department could discuss ways for increasing the University Ranking through Research programs. First, there could be a better dissemination of ChemEng Research results of European Programs both internally with other departments of CUT and externally with other public Universities in order to make gradually an ecosystem of E-Universities in the Republic of Cyprus.

Actions Taken by the Institution

AN4) To address these suggestions, DCE plans to take the following actions:

a) Empowering PhD Students: DCE recognizes the importance of students taking an active role in shaping their learning experience and becoming future active citizens. The Department will actively collaborate with administration and research officers to provide opportunities for PhD students to lead initiatives, such as offering classes or mentoring programmes for undergraduate Chemical Engineering students and public departments through CUT's E-learning platform. This direction will not only enhance the learning experience, but also contribute to the development of leadership skills among the PhD students involved.
b) Establishing Research Leadership: Building upon the strengths of the Department's research programmes, DCE will work towards increasing the University Ranking through impactful research initiatives. Improved dissemination of Chemical Engineering research results obtained via European programmes will be prioritized, both internally within other Departments of CUT and externally with other public universities. Published papers and dissemination activities from research programmes will be communicated through departmental and university social media platforms.

2. Teaching staff
(ESG 1.5)

Areas of improvement and recommendations for BSc

Q1) Employment of more core-chemical-engineering faculty.

Actions Taken by the Institution

AN1) DCE agrees with the committee that it is essential to employ more faculty members with a first degree in Chemical Engineering. The specific requirement is part of the Strategic Plan of DCE. Towards this direction, DCE expects that two (2) more faculty members will be added in early 2024 and three (3) more by the end of 2025 based on running and planned hiring procedures.

Areas of improvement and recommendations for PhD

Q2) There are not many problems detected during this virtual visit, regarding the teaching staff of PhD programs. We do believe it would be helpful for students, enrolling with an MSc as their basis, to be able to take university courses. Presently students enrolled with an MSc degree are not supposed to do that. However, there can be a need for courses – even at PhD level – when trying to learn something new.

Actions Taken by the Institution

AN2) We would like to thank the committee for the observation that not many problems were detected during the virtual visit regarding the teaching staff in our PhD programme. DCE understands the importance of providing flexibility and opportunities for students holding a Master's degree to further enhance their knowledge and skills through university courses. As mentioned above, PhD candidates have the option to enroll and earn credits in two undergraduate courses, as recommended by the Departmental Postgraduate Committee. If they do not possess a Master's degree, they should attend at least eight courses (up to two undergraduate and at least six postgraduate). PhD students can additionally participate in the seminars offered by the LDN of CUT. Currently, students with a Master's degree are not required to take additional university courses, as they are credited with 60 ECTS. However, we acknowledge that there could be instances where PhD students, even those with a Master's degree, may need to acquire new knowledge or skills in order to effectively pursue their research.

The decision to credit 60 ECTS for students with a Master's degree is determined by the Postgraduate Studies Committee, followed by the approval of the Departmental Board. However, if a supervisor determines that a PhD student lacks the necessary background or expertise in a particular area, they have the option to propose that the student should take one or more courses to support the student. DCE strives to maintain a balance between providing students with the flexibility to pursue their research interests and ensuring they have the necessary skills and knowledge to succeed in their PhD studies. The consideration of additional courses for individual students constitutes a collaborative decision-making process between the student, their supervisor, and the relevant departmental committees.

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

Areas of improvement and recommendations for BSc

Q1) Consider streamlining a process to address cases where students may face difficulty in passing compulsory courses, such as issuing alternative awards (e.g., certificates or diplomas) with lesser requirements.

Actions Taken by the Institution

AN1) Unfortunately, alternative awards cannot be issued based on University regulations. To the best of our knowledge, public universities in Cyprus cannot issue alternative awards to accommodate cases where students face difficulty in passing specific compulsory courses.

Areas of improvement and recommendations for PhD

No specific areas of improvement identified.

4. Learning resources and student support
(ESG 1.6)

Areas of improvement and recommendations for BSc
Q1) A more integrated campus would be desirable.

Actions Taken by the Institution
AN1) DCE fully agrees that a more integrated campus would be desirable. To address this issue, the Department actively communicates and expresses its needs for a more integrated campus to the authorities of the University through the Dean of the faculty, where DCE highlights the benefits of creating spaces and initiatives that facilitate interdisciplinary interactions, shared resources and collaborative opportunities among different departments and disciplines.

Based on the University's Strategic Plan DCE is expected to move to a new building in Veregaria area situated outside the city center of Limassol. However, the specific plan requires several years to materialize and until then DCE will be confined within the dispersed premises currently available in the main campus of CUT in the center of Limassol.

Areas of improvement and recommendations for PhD
Q2) A more integrated campus would be desirable.

Actions Taken by the Institution
AN2) Please see our response in AN1 above.

5. Additional for doctoral programmes
(ALL ESG)

Areas of improvement and recommendations
Q1) The final assessment of PhD thesis may enhance the involvement of subject experts from recognized external research environments.

Actions Taken by the Institution
AN1) According to the University's regulations, external members of the PhD dissertation Examination Committee must possess expertise relevant to the subject of the dissertation. Additionally, it is essential to avoid any conflict of interest between the student and external evaluators. Therefore, each member of the Examination Committee, apart from the Research Advisor, is required to submit a statement declaring any potential conflict of interest. The composition of the examination committee, including a declaration of the relevance of the research expertise of each member to the topic of the PhD Thesis, is approved first by the Departmental Board followed by the Faculty Board. To ensure that the members of the Examination Committee are indeed experts in the topic of the PhD Thesis, the research advisor should document their qualifications and expertise. This documentation should be presented in a comprehensive manner to the Departmental Board, providing detailed information about the external members' backgrounds and areas of specialization.
Thus, although University regulations already require the involvement of external subject experts in the PhD Examination Committee, the Department will further promote the inclusion of experts from recognized research environments to enhance the quality of the programme.

7. Eligibility (Joint programme)

(ALL ESG)

N/A

Areas of improvement and recommendations **by EEC**	Actions Taken by the Institution	For Official Use ONLY
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Click or tap here to enter text.	Click or tap here to enter text.	Choose level of compliance:

B. Conclusions and final remarks

Recommendations:

• Q1) Recruitment of more faculty with core-chemical-engineering competences
• Q2) Better integration of facilities within the same (or closely situated) buildings
• Q3) There seems not to be much consciousness among students about representation and how to exert influence on programs, this makes the students an under-utilized resource in the development of the programs
• Q4) Somewhat more emphasis on practical operation of chemical engineering processing systems at intermediate to larger scale
• Q5) Develop access to practical experiences with larger scale processing equipment. Internships may help with this, but then internships must not reduce to analytical work only

Actions Taken by the Institution

• AN1) DCE anticipates that two (2) more faculty members will be recruited in early 2024 and three (3) more by the end of 2025.
• AN2) DCE is expected to move to a new building in Veregaria area (outside the city center of Limassol) as specified in the Strategic Plan of CUT.
• AN3) Students can bring up issues through the three (3) student representatives in the Departmental Board. Subsequently, the Departmental Undergraduate Studies Committee, which oversees handling of various tasks related to Undergraduate studies and the curriculum, is responsible to either directly resolve the issues raised by students or to inform the Departmental Board aiming to seek for optimal solutions.
• AN4+5) Currently students participate in one (1) laboratory practical experience at the IESC Innovating Environmental Solutions Center Ltd (http://www.iesc-ltd.com/) which is located in Ypsonas in Limassol as part of the laboratory exercises which are included in the course CEN 302 “Chemical Technology Laboratory”. DCE will supplement the specific course with an additional laboratory exercise that will be conducted at a relevant industry. A very small number of Internships covering analytical work only will be eliminated.

C. Higher Education Institution academic representatives

Name	*Position*	*Signature*
Michalis Koutinas	Department Chair	
Alexandros Charalambides	Program Coordinator	
Ioannis Vyrides	Postgraduate Studies Committee	
Pavlos Stefanou	Undergraduate Studies Committee	Παύλος Στεφάνου
Achilleas Konstantinou	Undergraduate Studies Committee	Αχιλλέας Κωνσταντίνου
Click to enter Name	Click to enter Position	

Date: 10/8/2023

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e-mail: info@dipae.ac.cy

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)**

Programme 1 – BSc

In Greek:

Προπτυχιακό Πρόγραμμα στη Χημική Μηχανική (4 έτη, 240 ECTS)

In English:

Undergraduate Programme in Chemical Engineering (4 years, 240 ECTS

Language(s) of instruction: Greek

Programme 2 – PhD[Title 2]

In Greek:

Διδακτορικό Πρόγραμμα στη Χημική Μηχανική και Περιβαλλοντική Τεχνολογία (3 έτη, 240 ECTS)

In English:

PhD Programme in Chemical Engineering and Environmental Technology (3 years, 240 ECTS)

Language(s) of instruction: Greek

- **Programme's status:** Choose Status
- **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 300.1.1/1 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. The answers' documentation should be brief and accurate and supported by the relevant documentation. Referral to annexes should be made only when necessary.*

- *In particular, under each assessment area and by using the 2nd column of each table, the HEI must respond on the following:*

  - *the areas of improvement and recommendations of the EEC*
  - *the conclusions and final remarks noted by the EEC*

- *The institution should respond to the EEC comments, in the designated area next each comment. The comments of the EEC should be copied from the EEC report **without any interference** in the content.*

- *In case of annexes, those should be attached and sent on separate document(s). Each document should be in *.pdf format and named as annex1, annex2, etc.*

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

Areas of improvement and recommendations for BSc

Q1) Enhance the involvement of external stakeholders, including employers, industrial practitioners, and subject experts from other institutions, especially those in recognized research environments.

Actions Taken by the Institution

AN1) Such involvement of external stakeholders has already been done to a certain extent. For example, we have stated that several laboratory exercises are conducted or are planned to be conducted at different industries where employees provide their knowledge to the students. Specifically, the students of CEN 302 "Chemical Technology Laboratory" conduct a lab exercise at the Innovating Environmental Solutions Center (IESC Ltd) located in Limassol. The Department aims to further strengthen the programme by providing an additional lab exercise of CEN 302 at the premises of a relevant industry. Moreover, the practical training course (CEN 309) takes place in the industry, while the Department organizes several events (e.g. invited talks from the industry and public sector, workshops, practical training courses/sessions) with the participation of various stakeholders. These actions will be further extended over the next few years.

Q2) Increase the frequency of course and program reviews, considering an annual or biennial cycle to ensure ongoing improvement. Given the program's relative newness, the recent completion of a program review cycle is unclear.

Actions Taken by the Institution

AN2) The program is revised constantly by the Departmental Undergraduate Studies Committee (USC). The specific committee is responsible for constantly monitoring the programme, taking action to propose solutions when problems arise as well as to inform the Departmental Board about cases that cannot be independently solved by USC. An annual review of the programme will be targeted, between the USC and student representatives.

Q3) Conduct a top-down review of the program to course level to address repetitions, and include topics such as computer applications, programming, artificial intelligence and machine learning, engineering thermodynamics, sustainability and ethics, process safety, group design, and teamwork throughout the curriculum.

Actions Taken by the Institution

AN3) a) We have conducted a complete review of the curriculum and we have indeed identified a few cases of repetition. An important case is the introduction of students to mass and energy balances in CEN 111 "Introduction to Chemical Engineering", which are also taught in more detail during CEN 206 "Mass and Energy Balance". However, it should be noted that the introduction in CEN 111 constitutes only an introductory course, which is needed to cover the rest of the material. Thus, the description of the specific course has been modified aiming to clarify that the teaching of

mass and energy balances in CEN 111 consists only introductory material. Moreover, in CEN 204 "Applied Thermodynamics I" students are taught chemical kinetics, which is additionally taught in CEN 210 "Chemical Reaction Engineering". Since chemical kinetics, as pointed out by the EEC, is not relevant content to a thermodynamics course, we have removed the specific material from the description of CEN 204 and thermodynamics content has been added instead. The revised course descriptions are provided in Annex 1.

b) Aiming to introduce students to Aspen Hysys simulations prior teaching of CEN 311, based on a point raised by the EEC during the meeting with the teaching staff on May 26th 2023, a few simple simulations in the Unit operations courses (CEN 209 "Unit Operations I" and CEN 327 "Unit Operations II") as well as CEN 307 "Chemical Reactor Design and Installation" will be included. For example, during an additional tutorial of CEN 209 students could be instructed on the use of simple modules of Hysys and perform the simulation of a pump and a heat exchanger operation to meet specific conditions (e.g. calculation of the cold fluid flow rate to reach a prespecified exit temperature of the hot fluid). Similarly, during CEN 327 students could simulate the distillation process of a multi-component mixture and of an adsorption column, while in CEN 307 the non-isothermal operation of chemical reactors (which usually cannot be solved analytically) could be simulated. In the same courses (CEN 209, CEN 307 and CEN 327), it has been clarified that the project given to students is computational using Matlab and performed in groups. The revised descriptions of the aforementioned courses are also provided in Annex I.

c) The content of CEN 305 has been almost completely revised to introduce additional engineering thermodynamics material. We have also decided to convert the Environmental Chemical Engineering Specialization module CEN 321 "Wastewater and Liquid Waste Treatment Technologies" into a core module given its high importance to Chemical Engineers. Furthermore, the content of the course has been modified to cover more sustainability issues as per the Committee's suggestion. The revised description is available in Annex 1. Based on this change, one module from the Petrochemical Engineering Specialization should be removed. We have selected CEN 329 "Detection and Utilization of Hydrocarbon Reservoirs" which is the course least related to Chemical Engineering. However, given that the modified curriculum will be applicable to students enrolling in September 2023, the specific change will be implemented after 2 years (the inclusion of more sustainability related content will be applied immediately though). The revised course descriptions of both CEN 305 and CEN 321 are also provided in Annex I.

d) Regarding process and lab safety issues, such topics are always covered during the introductory lecture in every laboratory course. Based on the comment of the committee, the specific topic has been now included in the introductory course CEN 100 "Professional Skills for Chemical Engineers" of the first semester (see Annex I for the revised description).

e) Aiming to add further computational courses, we need to remove courses already included in the curriculum. As discussed during the meeting, the objective here is to remove non-essential Engineering courses such as CEN 213 "Engineering Mechanics" and CEN 306 "Electrical Circuits" and replace them with new computational courses. Given that both courses that should be removed comprise a suggestion, since the establishment of the Chemical Engineering programme of CUT, by the Cyprus Scientific and Technical Chamber (CSTC), prior their removal from the curriculum the specific change should be first confirmed with CSTC. However, we have enriched in the meantime

the description of CEN 301 "Dynamic Simulation with the Use of Computers" (see Annex I for the revised description).

Areas of improvement and recommendations for PhD

Q4) Consider enhancing the involvement of subject experts from recognized research environments in the evaluation committee for theses.

Actions Taken by the Institution

AN4) According to the University's regulations, external members of the PhD dissertation Examination Committee must possess expertise relevant to the subject of the dissertation and comply with specified regulations. Additionally, it is essential to avoid any conflict of interest between the student and external evaluators. Therefore, each member of the Examination Committee, apart from the Research Advisor, is required to submit a statement declaring any potential conflict of interest. The composition of the examination committee, including a declaration of the relevance of the research expertise of each member to the topic of the PhD Thesis, is approved first by the Departmental Board followed by the Faculty Board. To ensure that the members of the Examination Committee are indeed experts in the topic of the PhD Thesis, the research advisor should document their qualifications and expertise. This documentation should be presented in a comprehensive manner to the Departmental Board, providing detailed information about the external members' backgrounds and areas of specialization. According to University's regulations, at least one external examiner (coming from a different University or Institution) should be included in the external committee, while the additional examiner of the committee could be either an internal or external faculty member. Thus, although University regulations already require the involvement of external subject experts in the PhD Examination Committee, the Department will further promote the inclusion of experts from recognized research environments to enhance the quality of the programme.

Q5) Offer optional short courses in research methods, programming, career planning, project management, and other relevant areas to all PhD students, tailoring recommendations to individual students' needs.

Actions Taken by the Institution

AN5) The Department of Chemical Engineering (DCE) has implemented several strategies and will implement even more if necessary to enhance the learning experiences of its PhD students. The following points outline the initiatives and resources offered by the Department:

a) Through the Learning Development Network (LDN) of Cyprus University of Technology (CUT), PhD students can participate in several courses offered. LDN aims to design and implement seminars and workshops based on innovative teaching practices, promote the exchange of good teaching practices, contribute to the long-term educational policy of the University, provide continuous support for academic practice, and coordinate and operate new, creative learning spaces at the University (https://ldn.cut.ac.cy/). DCE should specify the minimum number of courses offered by LDN that PhD students should attend per year.
b) The Department organizes a mandatory seminar series that PhD students are required to attend. These seminars aim to equip students with essential knowledge relevant to their research area.

The seminars include academic lectures by external researchers or professors, presentations on statistical packages and professional skills training. Moreover, neither the teaching and research staff nor the PhD students are required to pay additional tuition fees to participate in the seminars.

c) The LDN of CUT organizes a Summer School every year for doctoral students from the 8 Universities participating in the alliance of the European University of Technology (EUt+). The Summer School program includes lectures, discussions, exercises and networking activities delivered in English. The Summer School aims to introduce students to their new role as PhD candidates and provide them with tools to manage projects, research education, work/life balance and collaboration with supervisors. The first-year PhD students of DCE will be encouraged to attend this course.

d) Through research-funded projects, workshops or training schools are organized by faculty members of the Department, providing opportunities for PhD students to attend. For example, the specialized training school "Ecofriendly multipurpose Biobased Products from municipal biowaste" was organized by LIFE EBP (a LIFE+ project focused on the valorization of the organic fraction of municipal solid waste for fertilizer production in agricultural applications https://www.lifeebp.eu/resources/posts/8/Leaflet%20EBP%20A5.pdf) between 13-14 October 2022 in Limassol at the premises of CUT. Moreover, the "An ocean of opportunities" hybrid training school on bridging the gap between applied sciences and commercialization potential with an in-depth workshop on communication and pitching the idea was organized at the premises of CUT, the Cyprus Marine Aquaculture Research Center of the DFMR and the Cyprus Marine and Maritime Institute between 2-6 May 2022. The training school was supported by the COST Action Ocean4Biotech (CA18238), the Junior Achievements Cyprus, the European University of Technology and the XPRO Consulting Limited, Cyprus (see also https://www.cmmi.blue/an-ocean-of-opportunities-hybrid-training-school/).

Student – centred learning, teaching and assessment

(ESG 1.3)

Areas of improvement and recommendations for BSc

Process of teaching and learning and student-centered teaching methodology

Q1) The process of teaching and learning should support students' individual and social development, including the development of national and European identity, social responsibility and active citizenship initiatives for chemical communities/industrial areas of Cyprus. The Head of department could follow the 4 purposes of higher education of the Council of Europe.

Actions Taken by the Institution

AN1) The 4 major purposes for higher education as identified by the Council of Europe are as follows: a) preparation for the labor market, b) preparation for life as active citizens in democratic societies, c) personal development and d) development of a broad and advanced knowledge base. Some of these are actually dealt with at university level, by one of the support groups of LDN (htttp://ldn.cut.ac.cy/el/) in CUT, that offers academic learning support and aims at developing the study and learning skills of students, including doctoral students and researchers, by offering training programmes in teaching and research skills, as well as in skills of writing research proposals.

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At departmental level, students also get acquainted with chemical, and other, industries through seminars given as part of courses CEN 407 "Studies and Career Interconnection Seminars I" and CEN 408 "Studies and Career Interconnection Seminars II".

Practical training

Q2) The duration of practical training of students, following discussion with them, could be possibly extended. The University could expand the list of the collaborating industries and companies that accept students for practical training and include also all the working environments in which Chemical Engineers could work in the future (public, private, remote). That would benefit both the students and also the public awareness about the department and the role of Chemical Engineering in society and in the local economy.

Actions Taken by the Institution

AN2) Although it would be desirable to extend the practical training, this is unfortunately difficult to achieve. Practical training starts upon completion of the examination period of the spring semester in early June and it should last between 4-6 weeks. If both the company and the student wish, the duration could be further extended until the end of August prior commencement of the next semester at the beginning of September. However, many companies in Cyprus substantially reduce their activity for approximately 2 weeks in August due to the vacation taken by their staff. This fact restricts

extending the duration of practical training for all students, given that it will be extremely difficult to secure the number of extended placements required to cover all students due to the aforementioned particularity.

DCE frequently updates the list of companies accepting students for practical training and, given that the programme has been active for only 6 years, the current list is increasing every year. Moreover, we would like to thank the committee for the recommendation to add organizations for practical training from the public sector. It should be noted that DCE already has students conducting their practical training in public authorities, such as the Sewerage Board of Limassol-Amathus and Larnaca Sewerage Board. Moreover, DCE has established a preliminary agreement to appoint students to the Cyprus Hydrocarbons Company (CHC), which is the National (State owned) Oil and Gas Company of Cyprus, and the Cyprus Organisation for Standardisation (CYS), which is the national standardisation body of Cyprus.

Areas of improvement and recommendations for PhD

Process of teaching and learning and student-centered teaching methodology

Q3) It would be a benefit for students to be able to take some ECTS-course credits, instead of having to rely on colleagues to learn necessary things, such as the use of MATLAB or similar.

Students are encouraged to take a more active role in creating the learning and research process and in being the future active citizens. Particularly PhD students in collaboration with administration and research officers shall be leaders in making CUT a young leader in Public Learning organizations (e.g. provide classes or mentoring for Chemeng students and public departments though CUT E--learning platform). We also suggest they be involved in making CUT a Research leader within public organizations.

Actions Taken by the Institution

AN3) PhD candidates have the option to enroll and earn credits in two undergraduate courses, as recommended by the Departmental Postgraduate Committee. If they do not possess a Master's degree, they should attend at least eight courses (up to two undergraduate and at least six postgraduate). Currently, students with a Master's degree are not required to take additional university courses, as they are credited with 60 ECTS. However, we acknowledge that there may be instances where PhD students, even those with a Master's degree, may need to acquire new knowledge or skills in order to effectively pursue their research. In these cases, students may, if they wish to, enroll to courses.
PhD students can additionally participate in the seminars offered by the LDN of CUT. Moreover, PhD candidates are obliged to participate in at least one taught laboratory course as Teaching Assistants. However, although DCE commits students for one laboratory course, the vast majority of students participate as Teaching Assistants in several courses.

Q4) The department could discuss ways for increasing the University Ranking through Research programs. First, there could be a better dissemination of ChemEng Research results of European Programs both internally with other departments of CUT and externally with other public Universities in order to make gradually an ecosystem of E-Universities in the Republic of Cyprus.

Actions Taken by the Institution

AN4) To address these suggestions, DCE plans to take the following actions:

a) Empowering PhD Students: DCE recognizes the importance of students taking an active role in shaping their learning experience and becoming future active citizens. The Department will actively collaborate with administration and research officers to provide opportunities for PhD students to lead initiatives, such as offering classes or mentoring programmes for undergraduate Chemical Engineering students and public departments through CUT's E-learning platform. This direction will not only enhance the learning experience, but also contribute to the development of leadership skills among the PhD students involved.
b) Establishing Research Leadership: Building upon the strengths of the Department's research programmes, DCE will work towards increasing the University Ranking through impactful research initiatives. Improved dissemination of Chemical Engineering research results obtained via European programmes will be prioritized, both internally within other Departments of CUT and externally with other public universities. Published papers and dissemination activities from research programmes will be communicated through departmental and university social media platforms.

2. Teaching staff
(ESG 1.5)

Areas of improvement and recommendations for BSc

Q1) Employment of more core-chemical-engineering faculty.

Actions Taken by the Institution

AN1) DCE agrees with the committee that it is essential to employ more faculty members with a first degree in Chemical Engineering. The specific requirement is part of the Strategic Plan of DCE. Towards this direction, DCE expects that two (2) more faculty members will be added in early 2024 and three (3) more by the end of 2025 based on running and planned hiring procedures.

Areas of improvement and recommendations for PhD

Q2) There are not many problems detected during this virtual visit, regarding the teaching staff of PhD programs. We do believe it would be helpful for students, enrolling with an MSc as their basis, to be able to take university courses. Presently students enrolled with an MSc degree are not supposed to do that. However, there can be a need for courses – even at PhD level – when trying to learn something new.

Actions Taken by the Institution

AN2) We would like to thank the committee for the observation that not many problems were detected during the virtual visit regarding the teaching staff in our PhD programme. DCE understands the importance of providing flexibility and opportunities for students holding a Master's degree to further enhance their knowledge and skills through university courses. As mentioned above, PhD candidates have the option to enroll and earn credits in two undergraduate courses, as recommended by the Departmental Postgraduate Committee. If they do not possess a Master's degree, they should attend at least eight courses (up to two undergraduate and at least six postgraduate). PhD students can additionally participate in the seminars offered by the LDN of CUT. Currently, students with a Master's degree are not required to take additional university courses, as they are credited with 60 ECTS. However, we acknowledge that there could be instances where PhD students, even those with a Master's degree, may need to acquire new knowledge or skills in order to effectively pursue their research.

The decision to credit 60 ECTS for students with a Master's degree is determined by the Postgraduate Studies Committee, followed by the approval of the Departmental Board. However, if a supervisor determines that a PhD student lacks the necessary background or expertise in a particular area, they have the option to propose that the student should take one or more courses to support the student. DCE strives to maintain a balance between providing students with the flexibility to pursue their research interests and ensuring they have the necessary skills and knowledge to succeed in their PhD studies. The consideration of additional courses for individual students constitutes a collaborative decision-making process between the student, their supervisor, and the relevant departmental committees.

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

Areas of improvement and recommendations for BSc

Q1) Consider streamlining a process to address cases where students may face difficulty in passing compulsory courses, such as issuing alternative awards (e.g., certificates or diplomas) with lesser requirements.

Actions Taken by the Institution

AN1) Unfortunately, alternative awards cannot be issued based on University regulations. To the best of our knowledge, public universities in Cyprus cannot issue alternative awards to accommodate cases where students face difficulty in passing specific compulsory courses.

Areas of improvement and recommendations for PhD

No specific areas of improvement identified.

4. Learning resources and student support
(ESG 1.6)

Areas of improvement and recommendations for BSc
Q1) A more integrated campus would be desirable.

Actions Taken by the Institution
AN1) DCE fully agrees that a more integrated campus would be desirable. To address this issue, the Department actively communicates and expresses its needs for a more integrated campus to the authorities of the University through the Dean of the faculty, where DCE highlights the benefits of creating spaces and initiatives that facilitate interdisciplinary interactions, shared resources and collaborative opportunities among different departments and disciplines.

Based on the University's Strategic Plan DCE is expected to move to a new building in Veregaria area situated outside the city center of Limassol. However, the specific plan requires several years to materialize and until then DCE will be confined within the dispersed premises currently available in the main campus of CUT in the center of Limassol.

Areas of improvement and recommendations for PhD
Q2) A more integrated campus would be desirable.

Actions Taken by the Institution
AN2) Please see our response in AN1 above.

5. Additional for doctoral programmes
(ALL ESG)

Areas of improvement and recommendations
Q1) The final assessment of PhD thesis may enhance the involvement of subject experts from recognized external research environments.

Actions Taken by the Institution
AN1) According to the University's regulations, external members of the PhD dissertation Examination Committee must possess expertise relevant to the subject of the dissertation. Additionally, it is essential to avoid any conflict of interest between the student and external evaluators. Therefore, each member of the Examination Committee, apart from the Research Advisor, is required to submit a statement declaring any potential conflict of interest. The composition of the examination committee, including a declaration of the relevance of the research expertise of each member to the topic of the PhD Thesis, is approved first by the Departmental Board followed by the Faculty Board. To ensure that the members of the Examination Committee are indeed experts in the topic of the PhD Thesis, the research advisor should document their qualifications and expertise. This documentation should be presented in a comprehensive manner to the Departmental Board, providing detailed information about the external members' backgrounds and areas of specialization.
Thus, although University regulations already require the involvement of external subject experts in the PhD Examination Committee, the Department will further promote the inclusion of experts from recognized research environments to enhance the quality of the programme.

7. Eligibility (Joint programme)

(ALL ESG)

N/A

Areas of improvement and recommendations **by EEC**	Actions Taken by the Institution	For Official Use ONLY
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B. Conclusions and final remarks

Recommendations:

• Q1) Recruitment of more faculty with core-chemical-engineering competences
• Q2) Better integration of facilities within the same (or closely situated) buildings
• Q3) There seems not to be much consciousness among students about representation and how to exert influence on programs, this makes the students an under-utilized resource in the development of the programs
• Q4) Somewhat more emphasis on practical operation of chemical engineering processing systems at intermediate to larger scale
• Q5) Develop access to practical experiences with larger scale processing equipment. Internships may help with this, but then internships must not reduce to analytical work only

Actions Taken by the Institution

• AN1) DCE anticipates that two (2) more faculty members will be recruited in early 2024 and three (3) more by the end of 2025.
• AN2) DCE is expected to move to a new building in Veregaria area (outside the city center of Limassol) as specified in the Strategic Plan of CUT.
• AN3) Students can bring up issues through the three (3) student representatives in the Departmental Board. Subsequently, the Departmental Undergraduate Studies Committee, which oversees handling of various tasks related to Undergraduate studies and the curriculum, is responsible to either directly resolve the issues raised by students or to inform the Departmental Board aiming to seek for optimal solutions.
• AN4+5) Currently students participate in one (1) laboratory practical experience at the IESC Innovating Environmental Solutions Center Ltd (http://www.iesc-ltd.com/) which is located in Ypsonas in Limassol as part of the laboratory exercises which are included in the course CEN 302 “Chemical Technology Laboratory”. DCE will supplement the specific course with an additional laboratory exercise that will be conducted at a relevant industry. A very small number of Internships covering analytical work only will be eliminated.

C. Higher Education Institution academic representatives

Name	*Position*	*Signature*
Michalis Koutinas	Department Chair	
Alexandros Charalambides	Program Coordinator	
Ioannis Vyrides	Postgraduate Studies Committee	
Pavlos Stefanou	Undergraduate Studies Committee	Παύλος Στεφάνου
Achilleas Konstantinou	Undergraduate Studies Committee	Αχιλλέας Κωνσταντίνου
Click to enter Name	Click to enter Position	

Date: 10/8/2023

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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)**

Programme 1 – BSc

In Greek:

Προπτυχιακό Πρόγραμμα στη Χημική Μηχανική (4 έτη, 240 ECTS)

In English:

Undergraduate Programme in Chemical Engineering (4 years, 240 ECTS

Language(s) of instruction: Greek

Programme 2 – PhD[Title 2]

In Greek:

Διδακτορικό Πρόγραμμα στη Χημική Μηχανική και Περιβαλλοντική Τεχνολογία (3 έτη, 240 ECTS)

In English:

PhD Programme in Chemical Engineering and Environmental Technology (3 years, 240 ECTS)

Language(s) of instruction: Greek

- **Programme's status:** Choose Status
- **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 300.1.1/1 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. The answers' documentation should be brief and accurate and supported by the relevant documentation. Referral to annexes should be made only when necessary.*

- *In particular, under each assessment area and by using the 2nd column of each table, the HEI must respond on the following:*

  - *the areas of improvement and recommendations of the EEC*
  - *the conclusions and final remarks noted by the EEC*

- *The institution should respond to the EEC comments, in the designated area next each comment. The comments of the EEC should be copied from the EEC report **without any interference** in the content.*

- *In case of annexes, those should be attached and sent on separate document(s). Each document should be in *.pdf format and named as annex1, annex2, etc.*

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

Areas of improvement and recommendations for BSc

Q1) Enhance the involvement of external stakeholders, including employers, industrial practitioners, and subject experts from other institutions, especially those in recognized research environments.

Actions Taken by the Institution

AN1) Such involvement of external stakeholders has already been done to a certain extent. For example, we have stated that several laboratory exercises are conducted or are planned to be conducted at different industries where employees provide their knowledge to the students. Specifically, the students of CEN 302 "Chemical Technology Laboratory" conduct a lab exercise at the Innovating Environmental Solutions Center (IESC Ltd) located in Limassol. The Department aims to further strengthen the programme by providing an additional lab exercise of CEN 302 at the premises of a relevant industry. Moreover, the practical training course (CEN 309) takes place in the industry, while the Department organizes several events (e.g. invited talks from the industry and public sector, workshops, practical training courses/sessions) with the participation of various stakeholders. These actions will be further extended over the next few years.

Q2) Increase the frequency of course and program reviews, considering an annual or biennial cycle to ensure ongoing improvement. Given the program's relative newness, the recent completion of a program review cycle is unclear.

Actions Taken by the Institution

AN2) The program is revised constantly by the Departmental Undergraduate Studies Committee (USC). The specific committee is responsible for constantly monitoring the programme, taking action to propose solutions when problems arise as well as to inform the Departmental Board about cases that cannot be independently solved by USC. An annual review of the programme will be targeted, between the USC and student representatives.

Q3) Conduct a top-down review of the program to course level to address repetitions, and include topics such as computer applications, programming, artificial intelligence and machine learning, engineering thermodynamics, sustainability and ethics, process safety, group design, and teamwork throughout the curriculum.

Actions Taken by the Institution

AN3) a) We have conducted a complete review of the curriculum and we have indeed identified a few cases of repetition. An important case is the introduction of students to mass and energy balances in CEN 111 "Introduction to Chemical Engineering", which are also taught in more detail during CEN 206 "Mass and Energy Balance". However, it should be noted that the introduction in CEN 111 constitutes only an introductory course, which is needed to cover the rest of the material. Thus, the description of the specific course has been modified aiming to clarify that the teaching of

mass and energy balances in CEN 111 consists only introductory material. Moreover, in CEN 204 "Applied Thermodynamics I" students are taught chemical kinetics, which is additionally taught in CEN 210 "Chemical Reaction Engineering". Since chemical kinetics, as pointed out by the EEC, is not relevant content to a thermodynamics course, we have removed the specific material from the description of CEN 204 and thermodynamics content has been added instead. The revised course descriptions are provided in Annex 1.

b) Aiming to introduce students to Aspen Hysys simulations prior teaching of CEN 311, based on a point raised by the EEC during the meeting with the teaching staff on May 26th 2023, a few simple simulations in the Unit operations courses (CEN 209 "Unit Operations I" and CEN 327 "Unit Operations II") as well as CEN 307 "Chemical Reactor Design and Installation" will be included. For example, during an additional tutorial of CEN 209 students could be instructed on the use of simple modules of Hysys and perform the simulation of a pump and a heat exchanger operation to meet specific conditions (e.g. calculation of the cold fluid flow rate to reach a prespecified exit temperature of the hot fluid). Similarly, during CEN 327 students could simulate the distillation process of a multi-component mixture and of an adsorption column, while in CEN 307 the non-isothermal operation of chemical reactors (which usually cannot be solved analytically) could be simulated. In the same courses (CEN 209, CEN 307 and CEN 327), it has been clarified that the project given to students is computational using Matlab and performed in groups. The revised descriptions of the aforementioned courses are also provided in Annex I.

c) The content of CEN 305 has been almost completely revised to introduce additional engineering thermodynamics material. We have also decided to convert the Environmental Chemical Engineering Specialization module CEN 321 "Wastewater and Liquid Waste Treatment Technologies" into a core module given its high importance to Chemical Engineers. Furthermore, the content of the course has been modified to cover more sustainability issues as per the Committee's suggestion. The revised description is available in Annex 1. Based on this change, one module from the Petrochemical Engineering Specialization should be removed. We have selected CEN 329 "Detection and Utilization of Hydrocarbon Reservoirs" which is the course least related to Chemical Engineering. However, given that the modified curriculum will be applicable to students enrolling in September 2023, the specific change will be implemented after 2 years (the inclusion of more sustainability related content will be applied immediately though). The revised course descriptions of both CEN 305 and CEN 321 are also provided in Annex I.

d) Regarding process and lab safety issues, such topics are always covered during the introductory lecture in every laboratory course. Based on the comment of the committee, the specific topic has been now included in the introductory course CEN 100 "Professional Skills for Chemical Engineers" of the first semester (see Annex I for the revised description).

e) Aiming to add further computational courses, we need to remove courses already included in the curriculum. As discussed during the meeting, the objective here is to remove non-essential Engineering courses such as CEN 213 "Engineering Mechanics" and CEN 306 "Electrical Circuits" and replace them with new computational courses. Given that both courses that should be removed comprise a suggestion, since the establishment of the Chemical Engineering programme of CUT, by the Cyprus Scientific and Technical Chamber (CSTC), prior their removal from the curriculum the specific change should be first confirmed with CSTC. However, we have enriched in the meantime

the description of CEN 301 "Dynamic Simulation with the Use of Computers" (see Annex I for the revised description).

Areas of improvement and recommendations for PhD

Q4) Consider enhancing the involvement of subject experts from recognized research environments in the evaluation committee for theses.

Actions Taken by the Institution

AN4) According to the University's regulations, external members of the PhD dissertation Examination Committee must possess expertise relevant to the subject of the dissertation and comply with specified regulations. Additionally, it is essential to avoid any conflict of interest between the student and external evaluators. Therefore, each member of the Examination Committee, apart from the Research Advisor, is required to submit a statement declaring any potential conflict of interest. The composition of the examination committee, including a declaration of the relevance of the research expertise of each member to the topic of the PhD Thesis, is approved first by the Departmental Board followed by the Faculty Board. To ensure that the members of the Examination Committee are indeed experts in the topic of the PhD Thesis, the research advisor should document their qualifications and expertise. This documentation should be presented in a comprehensive manner to the Departmental Board, providing detailed information about the external members' backgrounds and areas of specialization. According to University's regulations, at least one external examiner (coming from a different University or Institution) should be included in the external committee, while the additional examiner of the committee could be either an internal or external faculty member. Thus, although University regulations already require the involvement of external subject experts in the PhD Examination Committee, the Department will further promote the inclusion of experts from recognized research environments to enhance the quality of the programme.

Q5) Offer optional short courses in research methods, programming, career planning, project management, and other relevant areas to all PhD students, tailoring recommendations to individual students' needs.

Actions Taken by the Institution

AN5) The Department of Chemical Engineering (DCE) has implemented several strategies and will implement even more if necessary to enhance the learning experiences of its PhD students. The following points outline the initiatives and resources offered by the Department:

a) Through the Learning Development Network (LDN) of Cyprus University of Technology (CUT), PhD students can participate in several courses offered. LDN aims to design and implement seminars and workshops based on innovative teaching practices, promote the exchange of good teaching practices, contribute to the long-term educational policy of the University, provide continuous support for academic practice, and coordinate and operate new, creative learning spaces at the University (https://ldn.cut.ac.cy/). DCE should specify the minimum number of courses offered by LDN that PhD students should attend per year.
b) The Department organizes a mandatory seminar series that PhD students are required to attend. These seminars aim to equip students with essential knowledge relevant to their research area.

The seminars include academic lectures by external researchers or professors, presentations on statistical packages and professional skills training. Moreover, neither the teaching and research staff nor the PhD students are required to pay additional tuition fees to participate in the seminars.

c) The LDN of CUT organizes a Summer School every year for doctoral students from the 8 Universities participating in the alliance of the European University of Technology (EUt+). The Summer School program includes lectures, discussions, exercises and networking activities delivered in English. The Summer School aims to introduce students to their new role as PhD candidates and provide them with tools to manage projects, research education, work/life balance and collaboration with supervisors. The first-year PhD students of DCE will be encouraged to attend this course.

d) Through research-funded projects, workshops or training schools are organized by faculty members of the Department, providing opportunities for PhD students to attend. For example, the specialized training school "Ecofriendly multipurpose Biobased Products from municipal biowaste" was organized by LIFE EBP (a LIFE+ project focused on the valorization of the organic fraction of municipal solid waste for fertilizer production in agricultural applications https://www.lifeebp.eu/resources/posts/8/Leaflet%20EBP%20A5.pdf) between 13-14 October 2022 in Limassol at the premises of CUT. Moreover, the "An ocean of opportunities" hybrid training school on bridging the gap between applied sciences and commercialization potential with an in-depth workshop on communication and pitching the idea was organized at the premises of CUT, the Cyprus Marine Aquaculture Research Center of the DFMR and the Cyprus Marine and Maritime Institute between 2-6 May 2022. The training school was supported by the COST Action Ocean4Biotech (CA18238), the Junior Achievements Cyprus, the European University of Technology and the XPRO Consulting Limited, Cyprus (see also https://www.cmmi.blue/an-ocean-of-opportunities-hybrid-training-school/).

Student – centred learning, teaching and assessment

(ESG 1.3)

Areas of improvement and recommendations for BSc

Process of teaching and learning and student-centered teaching methodology

Q1) The process of teaching and learning should support students' individual and social development, including the development of national and European identity, social responsibility and active citizenship initiatives for chemical communities/industrial areas of Cyprus. The Head of department could follow the 4 purposes of higher education of the Council of Europe.

Actions Taken by the Institution

AN1) The 4 major purposes for higher education as identified by the Council of Europe are as follows: a) preparation for the labor market, b) preparation for life as active citizens in democratic societies, c) personal development and d) development of a broad and advanced knowledge base. Some of these are actually dealt with at university level, by one of the support groups of LDN (htttp://ldn.cut.ac.cy/el/) in CUT, that offers academic learning support and aims at developing the study and learning skills of students, including doctoral students and researchers, by offering training programmes in teaching and research skills, as well as in skills of writing research proposals.

LDN offers a series of integrated courses (seminars) on topics related to strengthening the knowledge and skills of both postgraduate and doctoral students. A few online seminars delivered over the past 2 years include the following topics: "Doctoral deadlines and selfcare" (this seminar referred to doctoral students and more specifically to the management of challenges arising from PhD studies), "Open discussion on accessibility and inclusion" (Roundtable discussion on issues of accessibility and inclusion in everyday life, student and professional life, virtual and face-to-face), and "Starting my own business: what should I know?" (the aim of the seminar was to explain basic concepts that should be known by students interested in starting their own business).

At departmental level, students also get acquainted with chemical, and other, industries through seminars given as part of courses CEN 407 "Studies and Career Interconnection Seminars I" and CEN 408 "Studies and Career Interconnection Seminars II".

Practical training

Q2) The duration of practical training of students, following discussion with them, could be possibly extended. The University could expand the list of the collaborating industries and companies that accept students for practical training and include also all the working environments in which Chemical Engineers could work in the future (public, private, remote). That would benefit both the students and also the public awareness about the department and the role of Chemical Engineering in society and in the local economy.

Actions Taken by the Institution

AN2) Although it would be desirable to extend the practical training, this is unfortunately difficult to achieve. Practical training starts upon completion of the examination period of the spring semester in early June and it should last between 4-6 weeks. If both the company and the student wish, the duration could be further extended until the end of August prior commencement of the next semester at the beginning of September. However, many companies in Cyprus substantially reduce their activity for approximately 2 weeks in August due to the vacation taken by their staff. This fact restricts

extending the duration of practical training for all students, given that it will be extremely difficult to secure the number of extended placements required to cover all students due to the aforementioned particularity.

DCE frequently updates the list of companies accepting students for practical training and, given that the programme has been active for only 6 years, the current list is increasing every year. Moreover, we would like to thank the committee for the recommendation to add organizations for practical training from the public sector. It should be noted that DCE already has students conducting their practical training in public authorities, such as the Sewerage Board of Limassol-Amathus and Larnaca Sewerage Board. Moreover, DCE has established a preliminary agreement to appoint students to the Cyprus Hydrocarbons Company (CHC), which is the National (State owned) Oil and Gas Company of Cyprus, and the Cyprus Organisation for Standardisation (CYS), which is the national standardisation body of Cyprus.

Areas of improvement and recommendations for PhD

Process of teaching and learning and student-centered teaching methodology

Q3) It would be a benefit for students to be able to take some ECTS-course credits, instead of having to rely on colleagues to learn necessary things, such as the use of MATLAB or similar.

Students are encouraged to take a more active role in creating the learning and research process and in being the future active citizens. Particularly PhD students in collaboration with administration and research officers shall be leaders in making CUT a young leader in Public Learning organizations (e.g. provide classes or mentoring for Chemeng students and public departments though CUT E--learning platform). We also suggest they be involved in making CUT a Research leader within public organizations.

Actions Taken by the Institution

AN3) PhD candidates have the option to enroll and earn credits in two undergraduate courses, as recommended by the Departmental Postgraduate Committee. If they do not possess a Master's degree, they should attend at least eight courses (up to two undergraduate and at least six postgraduate). Currently, students with a Master's degree are not required to take additional university courses, as they are credited with 60 ECTS. However, we acknowledge that there may be instances where PhD students, even those with a Master's degree, may need to acquire new knowledge or skills in order to effectively pursue their research. In these cases, students may, if they wish to, enroll to courses.
PhD students can additionally participate in the seminars offered by the LDN of CUT. Moreover, PhD candidates are obliged to participate in at least one taught laboratory course as Teaching Assistants. However, although DCE commits students for one laboratory course, the vast majority of students participate as Teaching Assistants in several courses.

Q4) The department could discuss ways for increasing the University Ranking through Research programs. First, there could be a better dissemination of ChemEng Research results of European Programs both internally with other departments of CUT and externally with other public Universities in order to make gradually an ecosystem of E-Universities in the Republic of Cyprus.

Actions Taken by the Institution

AN4) To address these suggestions, DCE plans to take the following actions:

a) Empowering PhD Students: DCE recognizes the importance of students taking an active role in shaping their learning experience and becoming future active citizens. The Department will actively collaborate with administration and research officers to provide opportunities for PhD students to lead initiatives, such as offering classes or mentoring programmes for undergraduate Chemical Engineering students and public departments through CUT's E-learning platform. This direction will not only enhance the learning experience, but also contribute to the development of leadership skills among the PhD students involved.
b) Establishing Research Leadership: Building upon the strengths of the Department's research programmes, DCE will work towards increasing the University Ranking through impactful research initiatives. Improved dissemination of Chemical Engineering research results obtained via European programmes will be prioritized, both internally within other Departments of CUT and externally with other public universities. Published papers and dissemination activities from research programmes will be communicated through departmental and university social media platforms.

2. Teaching staff
(ESG 1.5)

Areas of improvement and recommendations for BSc

Q1) Employment of more core-chemical-engineering faculty.

Actions Taken by the Institution

AN1) DCE agrees with the committee that it is essential to employ more faculty members with a first degree in Chemical Engineering. The specific requirement is part of the Strategic Plan of DCE. Towards this direction, DCE expects that two (2) more faculty members will be added in early 2024 and three (3) more by the end of 2025 based on running and planned hiring procedures.

Areas of improvement and recommendations for PhD

Q2) There are not many problems detected during this virtual visit, regarding the teaching staff of PhD programs. We do believe it would be helpful for students, enrolling with an MSc as their basis, to be able to take university courses. Presently students enrolled with an MSc degree are not supposed to do that. However, there can be a need for courses – even at PhD level – when trying to learn something new.

Actions Taken by the Institution

AN2) We would like to thank the committee for the observation that not many problems were detected during the virtual visit regarding the teaching staff in our PhD programme. DCE understands the importance of providing flexibility and opportunities for students holding a Master's degree to further enhance their knowledge and skills through university courses. As mentioned above, PhD candidates have the option to enroll and earn credits in two undergraduate courses, as recommended by the Departmental Postgraduate Committee. If they do not possess a Master's degree, they should attend at least eight courses (up to two undergraduate and at least six postgraduate). PhD students can additionally participate in the seminars offered by the LDN of CUT. Currently, students with a Master's degree are not required to take additional university courses, as they are credited with 60 ECTS. However, we acknowledge that there could be instances where PhD students, even those with a Master's degree, may need to acquire new knowledge or skills in order to effectively pursue their research.

The decision to credit 60 ECTS for students with a Master's degree is determined by the Postgraduate Studies Committee, followed by the approval of the Departmental Board. However, if a supervisor determines that a PhD student lacks the necessary background or expertise in a particular area, they have the option to propose that the student should take one or more courses to support the student. DCE strives to maintain a balance between providing students with the flexibility to pursue their research interests and ensuring they have the necessary skills and knowledge to succeed in their PhD studies. The consideration of additional courses for individual students constitutes a collaborative decision-making process between the student, their supervisor, and the relevant departmental committees.

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

Areas of improvement and recommendations for BSc

Q1) Consider streamlining a process to address cases where students may face difficulty in passing compulsory courses, such as issuing alternative awards (e.g., certificates or diplomas) with lesser requirements.

Actions Taken by the Institution

AN1) Unfortunately, alternative awards cannot be issued based on University regulations. To the best of our knowledge, public universities in Cyprus cannot issue alternative awards to accommodate cases where students face difficulty in passing specific compulsory courses.

Areas of improvement and recommendations for PhD

No specific areas of improvement identified.

4. Learning resources and student support
(ESG 1.6)

Areas of improvement and recommendations for BSc
Q1) A more integrated campus would be desirable.

Actions Taken by the Institution
AN1) DCE fully agrees that a more integrated campus would be desirable. To address this issue, the Department actively communicates and expresses its needs for a more integrated campus to the authorities of the University through the Dean of the faculty, where DCE highlights the benefits of creating spaces and initiatives that facilitate interdisciplinary interactions, shared resources and collaborative opportunities among different departments and disciplines.

Based on the University's Strategic Plan DCE is expected to move to a new building in Veregaria area situated outside the city center of Limassol. However, the specific plan requires several years to materialize and until then DCE will be confined within the dispersed premises currently available in the main campus of CUT in the center of Limassol.

Areas of improvement and recommendations for PhD
Q2) A more integrated campus would be desirable.

Actions Taken by the Institution
AN2) Please see our response in AN1 above.

5. Additional for doctoral programmes
(ALL ESG)

Areas of improvement and recommendations
Q1) The final assessment of PhD thesis may enhance the involvement of subject experts from recognized external research environments.

Actions Taken by the Institution
AN1) According to the University's regulations, external members of the PhD dissertation Examination Committee must possess expertise relevant to the subject of the dissertation. Additionally, it is essential to avoid any conflict of interest between the student and external evaluators. Therefore, each member of the Examination Committee, apart from the Research Advisor, is required to submit a statement declaring any potential conflict of interest. The composition of the examination committee, including a declaration of the relevance of the research expertise of each member to the topic of the PhD Thesis, is approved first by the Departmental Board followed by the Faculty Board. To ensure that the members of the Examination Committee are indeed experts in the topic of the PhD Thesis, the research advisor should document their qualifications and expertise. This documentation should be presented in a comprehensive manner to the Departmental Board, providing detailed information about the external members' backgrounds and areas of specialization.
Thus, although University regulations already require the involvement of external subject experts in the PhD Examination Committee, the Department will further promote the inclusion of experts from recognized research environments to enhance the quality of the programme.

7. Eligibility (Joint programme)

(ALL ESG)

N/A

Areas of improvement and recommendations **by EEC**	Actions Taken by the Institution	For Official Use ONLY
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B. Conclusions and final remarks

Recommendations:

• Q1) Recruitment of more faculty with core-chemical-engineering competences
• Q2) Better integration of facilities within the same (or closely situated) buildings
• Q3) There seems not to be much consciousness among students about representation and how to exert influence on programs, this makes the students an under-utilized resource in the development of the programs
• Q4) Somewhat more emphasis on practical operation of chemical engineering processing systems at intermediate to larger scale
• Q5) Develop access to practical experiences with larger scale processing equipment. Internships may help with this, but then internships must not reduce to analytical work only

Actions Taken by the Institution

• AN1) DCE anticipates that two (2) more faculty members will be recruited in early 2024 and three (3) more by the end of 2025.
• AN2) DCE is expected to move to a new building in Veregaria area (outside the city center of Limassol) as specified in the Strategic Plan of CUT.
• AN3) Students can bring up issues through the three (3) student representatives in the Departmental Board. Subsequently, the Departmental Undergraduate Studies Committee, which oversees handling of various tasks related to Undergraduate studies and the curriculum, is responsible to either directly resolve the issues raised by students or to inform the Departmental Board aiming to seek for optimal solutions.
• AN4+5) Currently students participate in one (1) laboratory practical experience at the IESC Innovating Environmental Solutions Center Ltd (http://www.iesc-ltd.com/) which is located in Ypsonas in Limassol as part of the laboratory exercises which are included in the course CEN 302 “Chemical Technology Laboratory”. DCE will supplement the specific course with an additional laboratory exercise that will be conducted at a relevant industry. A very small number of Internships covering analytical work only will be eliminated.

C. Higher Education Institution academic representatives

Name	*Position*	*Signature*
Michalis Koutinas	Department Chair	
Alexandros Charalambides	Program Coordinator	
Ioannis Vyrides	Postgraduate Studies Committee	
Pavlos Stefanou	Undergraduate Studies Committee	Παύλος Στεφάνου
Achilleas Konstantinou	Undergraduate Studies Committee	Αχιλλέας Κωνσταντίνου
Click to enter Name	Click to enter Position	

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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)**

Programme 1 – BSc

In Greek:

Προπτυχιακό Πρόγραμμα στη Χημική Μηχανική (4 έτη, 240 ECTS)

In English:

Undergraduate Programme in Chemical Engineering (4 years, 240 ECTS

Language(s) of instruction: Greek

Programme 2 – PhD[Title 2]

In Greek:

Διδακτορικό Πρόγραμμα στη Χημική Μηχανική και Περιβαλλοντική Τεχνολογία (3 έτη, 240 ECTS)

In English:

PhD Programme in Chemical Engineering and Environmental Technology (3 years, 240 ECTS)

Language(s) of instruction: Greek

- **Programme's status:** Choose Status
- **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 300.1.1/1 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. The answers' documentation should be brief and accurate and supported by the relevant documentation. Referral to annexes should be made only when necessary.*

- *In particular, under each assessment area and by using the 2nd column of each table, the HEI must respond on the following:*

  - *the areas of improvement and recommendations of the EEC*
  - *the conclusions and final remarks noted by the EEC*

- *The institution should respond to the EEC comments, in the designated area next each comment. The comments of the EEC should be copied from the EEC report **without any interference** in the content.*

- *In case of annexes, those should be attached and sent on separate document(s). Each document should be in *.pdf format and named as annex1, annex2, etc.*

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

Areas of improvement and recommendations for BSc

Q1) Enhance the involvement of external stakeholders, including employers, industrial practitioners, and subject experts from other institutions, especially those in recognized research environments.

Actions Taken by the Institution

AN1) Such involvement of external stakeholders has already been done to a certain extent. For example, we have stated that several laboratory exercises are conducted or are planned to be conducted at different industries where employees provide their knowledge to the students. Specifically, the students of CEN 302 "Chemical Technology Laboratory" conduct a lab exercise at the Innovating Environmental Solutions Center (IESC Ltd) located in Limassol. The Department aims to further strengthen the programme by providing an additional lab exercise of CEN 302 at the premises of a relevant industry. Moreover, the practical training course (CEN 309) takes place in the industry, while the Department organizes several events (e.g. invited talks from the industry and public sector, workshops, practical training courses/sessions) with the participation of various stakeholders. These actions will be further extended over the next few years.

Q2) Increase the frequency of course and program reviews, considering an annual or biennial cycle to ensure ongoing improvement. Given the program's relative newness, the recent completion of a program review cycle is unclear.

Actions Taken by the Institution

AN2) The program is revised constantly by the Departmental Undergraduate Studies Committee (USC). The specific committee is responsible for constantly monitoring the programme, taking action to propose solutions when problems arise as well as to inform the Departmental Board about cases that cannot be independently solved by USC. An annual review of the programme will be targeted, between the USC and student representatives.

Q3) Conduct a top-down review of the program to course level to address repetitions, and include topics such as computer applications, programming, artificial intelligence and machine learning, engineering thermodynamics, sustainability and ethics, process safety, group design, and teamwork throughout the curriculum.

Actions Taken by the Institution

AN3) a) We have conducted a complete review of the curriculum and we have indeed identified a few cases of repetition. An important case is the introduction of students to mass and energy balances in CEN 111 "Introduction to Chemical Engineering", which are also taught in more detail during CEN 206 "Mass and Energy Balance". However, it should be noted that the introduction in CEN 111 constitutes only an introductory course, which is needed to cover the rest of the material. Thus, the description of the specific course has been modified aiming to clarify that the teaching of

mass and energy balances in CEN 111 consists only introductory material. Moreover, in CEN 204 "Applied Thermodynamics I" students are taught chemical kinetics, which is additionally taught in CEN 210 "Chemical Reaction Engineering". Since chemical kinetics, as pointed out by the EEC, is not relevant content to a thermodynamics course, we have removed the specific material from the description of CEN 204 and thermodynamics content has been added instead. The revised course descriptions are provided in Annex 1.

b) Aiming to introduce students to Aspen Hysys simulations prior teaching of CEN 311, based on a point raised by the EEC during the meeting with the teaching staff on May 26th 2023, a few simple simulations in the Unit operations courses (CEN 209 "Unit Operations I" and CEN 327 "Unit Operations II") as well as CEN 307 "Chemical Reactor Design and Installation" will be included. For example, during an additional tutorial of CEN 209 students could be instructed on the use of simple modules of Hysys and perform the simulation of a pump and a heat exchanger operation to meet specific conditions (e.g. calculation of the cold fluid flow rate to reach a prespecified exit temperature of the hot fluid). Similarly, during CEN 327 students could simulate the distillation process of a multi-component mixture and of an adsorption column, while in CEN 307 the non-isothermal operation of chemical reactors (which usually cannot be solved analytically) could be simulated. In the same courses (CEN 209, CEN 307 and CEN 327), it has been clarified that the project given to students is computational using Matlab and performed in groups. The revised descriptions of the aforementioned courses are also provided in Annex I.

c) The content of CEN 305 has been almost completely revised to introduce additional engineering thermodynamics material. We have also decided to convert the Environmental Chemical Engineering Specialization module CEN 321 "Wastewater and Liquid Waste Treatment Technologies" into a core module given its high importance to Chemical Engineers. Furthermore, the content of the course has been modified to cover more sustainability issues as per the Committee's suggestion. The revised description is available in Annex 1. Based on this change, one module from the Petrochemical Engineering Specialization should be removed. We have selected CEN 329 "Detection and Utilization of Hydrocarbon Reservoirs" which is the course least related to Chemical Engineering. However, given that the modified curriculum will be applicable to students enrolling in September 2023, the specific change will be implemented after 2 years (the inclusion of more sustainability related content will be applied immediately though). The revised course descriptions of both CEN 305 and CEN 321 are also provided in Annex I.

d) Regarding process and lab safety issues, such topics are always covered during the introductory lecture in every laboratory course. Based on the comment of the committee, the specific topic has been now included in the introductory course CEN 100 "Professional Skills for Chemical Engineers" of the first semester (see Annex I for the revised description).

e) Aiming to add further computational courses, we need to remove courses already included in the curriculum. As discussed during the meeting, the objective here is to remove non-essential Engineering courses such as CEN 213 "Engineering Mechanics" and CEN 306 "Electrical Circuits" and replace them with new computational courses. Given that both courses that should be removed comprise a suggestion, since the establishment of the Chemical Engineering programme of CUT, by the Cyprus Scientific and Technical Chamber (CSTC), prior their removal from the curriculum the specific change should be first confirmed with CSTC. However, we have enriched in the meantime

the description of CEN 301 "Dynamic Simulation with the Use of Computers" (see Annex I for the revised description).

Areas of improvement and recommendations for PhD

Q4) Consider enhancing the involvement of subject experts from recognized research environments in the evaluation committee for theses.

Actions Taken by the Institution

AN4) According to the University's regulations, external members of the PhD dissertation Examination Committee must possess expertise relevant to the subject of the dissertation and comply with specified regulations. Additionally, it is essential to avoid any conflict of interest between the student and external evaluators. Therefore, each member of the Examination Committee, apart from the Research Advisor, is required to submit a statement declaring any potential conflict of interest. The composition of the examination committee, including a declaration of the relevance of the research expertise of each member to the topic of the PhD Thesis, is approved first by the Departmental Board followed by the Faculty Board. To ensure that the members of the Examination Committee are indeed experts in the topic of the PhD Thesis, the research advisor should document their qualifications and expertise. This documentation should be presented in a comprehensive manner to the Departmental Board, providing detailed information about the external members' backgrounds and areas of specialization. According to University's regulations, at least one external examiner (coming from a different University or Institution) should be included in the external committee, while the additional examiner of the committee could be either an internal or external faculty member. Thus, although University regulations already require the involvement of external subject experts in the PhD Examination Committee, the Department will further promote the inclusion of experts from recognized research environments to enhance the quality of the programme.

Q5) Offer optional short courses in research methods, programming, career planning, project management, and other relevant areas to all PhD students, tailoring recommendations to individual students' needs.

Actions Taken by the Institution

AN5) The Department of Chemical Engineering (DCE) has implemented several strategies and will implement even more if necessary to enhance the learning experiences of its PhD students. The following points outline the initiatives and resources offered by the Department:

a) Through the Learning Development Network (LDN) of Cyprus University of Technology (CUT), PhD students can participate in several courses offered. LDN aims to design and implement seminars and workshops based on innovative teaching practices, promote the exchange of good teaching practices, contribute to the long-term educational policy of the University, provide continuous support for academic practice, and coordinate and operate new, creative learning spaces at the University (https://ldn.cut.ac.cy/). DCE should specify the minimum number of courses offered by LDN that PhD students should attend per year.
b) The Department organizes a mandatory seminar series that PhD students are required to attend. These seminars aim to equip students with essential knowledge relevant to their research area.

The seminars include academic lectures by external researchers or professors, presentations on statistical packages and professional skills training. Moreover, neither the teaching and research staff nor the PhD students are required to pay additional tuition fees to participate in the seminars.

c) The LDN of CUT organizes a Summer School every year for doctoral students from the 8 Universities participating in the alliance of the European University of Technology (EUt+). The Summer School program includes lectures, discussions, exercises and networking activities delivered in English. The Summer School aims to introduce students to their new role as PhD candidates and provide them with tools to manage projects, research education, work/life balance and collaboration with supervisors. The first-year PhD students of DCE will be encouraged to attend this course.

d) Through research-funded projects, workshops or training schools are organized by faculty members of the Department, providing opportunities for PhD students to attend. For example, the specialized training school "Ecofriendly multipurpose Biobased Products from municipal biowaste" was organized by LIFE EBP (a LIFE+ project focused on the valorization of the organic fraction of municipal solid waste for fertilizer production in agricultural applications https://www.lifeebp.eu/resources/posts/8/Leaflet%20EBP%20A5.pdf) between 13-14 October 2022 in Limassol at the premises of CUT. Moreover, the "An ocean of opportunities" hybrid training school on bridging the gap between applied sciences and commercialization potential with an in-depth workshop on communication and pitching the idea was organized at the premises of CUT, the Cyprus Marine Aquaculture Research Center of the DFMR and the Cyprus Marine and Maritime Institute between 2-6 May 2022. The training school was supported by the COST Action Ocean4Biotech (CA18238), the Junior Achievements Cyprus, the European University of Technology and the XPRO Consulting Limited, Cyprus (see also https://www.cmmi.blue/an-ocean-of-opportunities-hybrid-training-school/).

Student – centred learning, teaching and assessment

(ESG 1.3)

Areas of improvement and recommendations for BSc

Process of teaching and learning and student-centered teaching methodology

Q1) The process of teaching and learning should support students' individual and social development, including the development of national and European identity, social responsibility and active citizenship initiatives for chemical communities/industrial areas of Cyprus. The Head of department could follow the 4 purposes of higher education of the Council of Europe.

Actions Taken by the Institution

AN1) The 4 major purposes for higher education as identified by the Council of Europe are as follows: a) preparation for the labor market, b) preparation for life as active citizens in democratic societies, c) personal development and d) development of a broad and advanced knowledge base. Some of these are actually dealt with at university level, by one of the support groups of LDN (htttp://ldn.cut.ac.cy/el/) in CUT, that offers academic learning support and aims at developing the study and learning skills of students, including doctoral students and researchers, by offering training programmes in teaching and research skills, as well as in skills of writing research proposals.

LDN offers a series of integrated courses (seminars) on topics related to strengthening the knowledge and skills of both postgraduate and doctoral students. A few online seminars delivered over the past 2 years include the following topics: "Doctoral deadlines and selfcare" (this seminar referred to doctoral students and more specifically to the management of challenges arising from PhD studies), "Open discussion on accessibility and inclusion" (Roundtable discussion on issues of accessibility and inclusion in everyday life, student and professional life, virtual and face-to-face), and "Starting my own business: what should I know?" (the aim of the seminar was to explain basic concepts that should be known by students interested in starting their own business).

At departmental level, students also get acquainted with chemical, and other, industries through seminars given as part of courses CEN 407 "Studies and Career Interconnection Seminars I" and CEN 408 "Studies and Career Interconnection Seminars II".

Practical training

Q2) The duration of practical training of students, following discussion with them, could be possibly extended. The University could expand the list of the collaborating industries and companies that accept students for practical training and include also all the working environments in which Chemical Engineers could work in the future (public, private, remote). That would benefit both the students and also the public awareness about the department and the role of Chemical Engineering in society and in the local economy.

Actions Taken by the Institution

AN2) Although it would be desirable to extend the practical training, this is unfortunately difficult to achieve. Practical training starts upon completion of the examination period of the spring semester in early June and it should last between 4-6 weeks. If both the company and the student wish, the duration could be further extended until the end of August prior commencement of the next semester at the beginning of September. However, many companies in Cyprus substantially reduce their activity for approximately 2 weeks in August due to the vacation taken by their staff. This fact restricts

extending the duration of practical training for all students, given that it will be extremely difficult to secure the number of extended placements required to cover all students due to the aforementioned particularity.

DCE frequently updates the list of companies accepting students for practical training and, given that the programme has been active for only 6 years, the current list is increasing every year. Moreover, we would like to thank the committee for the recommendation to add organizations for practical training from the public sector. It should be noted that DCE already has students conducting their practical training in public authorities, such as the Sewerage Board of Limassol-Amathus and Larnaca Sewerage Board. Moreover, DCE has established a preliminary agreement to appoint students to the Cyprus Hydrocarbons Company (CHC), which is the National (State owned) Oil and Gas Company of Cyprus, and the Cyprus Organisation for Standardisation (CYS), which is the national standardisation body of Cyprus.

Areas of improvement and recommendations for PhD

Process of teaching and learning and student-centered teaching methodology

Q3) It would be a benefit for students to be able to take some ECTS-course credits, instead of having to rely on colleagues to learn necessary things, such as the use of MATLAB or similar.

Students are encouraged to take a more active role in creating the learning and research process and in being the future active citizens. Particularly PhD students in collaboration with administration and research officers shall be leaders in making CUT a young leader in Public Learning organizations (e.g. provide classes or mentoring for Chemeng students and public departments though CUT E--learning platform). We also suggest they be involved in making CUT a Research leader within public organizations.

Actions Taken by the Institution

AN3) PhD candidates have the option to enroll and earn credits in two undergraduate courses, as recommended by the Departmental Postgraduate Committee. If they do not possess a Master's degree, they should attend at least eight courses (up to two undergraduate and at least six postgraduate). Currently, students with a Master's degree are not required to take additional university courses, as they are credited with 60 ECTS. However, we acknowledge that there may be instances where PhD students, even those with a Master's degree, may need to acquire new knowledge or skills in order to effectively pursue their research. In these cases, students may, if they wish to, enroll to courses.
PhD students can additionally participate in the seminars offered by the LDN of CUT. Moreover, PhD candidates are obliged to participate in at least one taught laboratory course as Teaching Assistants. However, although DCE commits students for one laboratory course, the vast majority of students participate as Teaching Assistants in several courses.

Q4) The department could discuss ways for increasing the University Ranking through Research programs. First, there could be a better dissemination of ChemEng Research results of European Programs both internally with other departments of CUT and externally with other public Universities in order to make gradually an ecosystem of E-Universities in the Republic of Cyprus.

Actions Taken by the Institution

AN4) To address these suggestions, DCE plans to take the following actions:

a) Empowering PhD Students: DCE recognizes the importance of students taking an active role in shaping their learning experience and becoming future active citizens. The Department will actively collaborate with administration and research officers to provide opportunities for PhD students to lead initiatives, such as offering classes or mentoring programmes for undergraduate Chemical Engineering students and public departments through CUT's E-learning platform. This direction will not only enhance the learning experience, but also contribute to the development of leadership skills among the PhD students involved.
b) Establishing Research Leadership: Building upon the strengths of the Department's research programmes, DCE will work towards increasing the University Ranking through impactful research initiatives. Improved dissemination of Chemical Engineering research results obtained via European programmes will be prioritized, both internally within other Departments of CUT and externally with other public universities. Published papers and dissemination activities from research programmes will be communicated through departmental and university social media platforms.

2. Teaching staff
(ESG 1.5)

Areas of improvement and recommendations for BSc

Q1) Employment of more core-chemical-engineering faculty.

Actions Taken by the Institution

AN1) DCE agrees with the committee that it is essential to employ more faculty members with a first degree in Chemical Engineering. The specific requirement is part of the Strategic Plan of DCE. Towards this direction, DCE expects that two (2) more faculty members will be added in early 2024 and three (3) more by the end of 2025 based on running and planned hiring procedures.

Areas of improvement and recommendations for PhD

Q2) There are not many problems detected during this virtual visit, regarding the teaching staff of PhD programs. We do believe it would be helpful for students, enrolling with an MSc as their basis, to be able to take university courses. Presently students enrolled with an MSc degree are not supposed to do that. However, there can be a need for courses – even at PhD level – when trying to learn something new.

Actions Taken by the Institution

AN2) We would like to thank the committee for the observation that not many problems were detected during the virtual visit regarding the teaching staff in our PhD programme. DCE understands the importance of providing flexibility and opportunities for students holding a Master's degree to further enhance their knowledge and skills through university courses. As mentioned above, PhD candidates have the option to enroll and earn credits in two undergraduate courses, as recommended by the Departmental Postgraduate Committee. If they do not possess a Master's degree, they should attend at least eight courses (up to two undergraduate and at least six postgraduate). PhD students can additionally participate in the seminars offered by the LDN of CUT. Currently, students with a Master's degree are not required to take additional university courses, as they are credited with 60 ECTS. However, we acknowledge that there could be instances where PhD students, even those with a Master's degree, may need to acquire new knowledge or skills in order to effectively pursue their research.

The decision to credit 60 ECTS for students with a Master's degree is determined by the Postgraduate Studies Committee, followed by the approval of the Departmental Board. However, if a supervisor determines that a PhD student lacks the necessary background or expertise in a particular area, they have the option to propose that the student should take one or more courses to support the student. DCE strives to maintain a balance between providing students with the flexibility to pursue their research interests and ensuring they have the necessary skills and knowledge to succeed in their PhD studies. The consideration of additional courses for individual students constitutes a collaborative decision-making process between the student, their supervisor, and the relevant departmental committees.

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

Areas of improvement and recommendations for BSc

Q1) Consider streamlining a process to address cases where students may face difficulty in passing compulsory courses, such as issuing alternative awards (e.g., certificates or diplomas) with lesser requirements.

Actions Taken by the Institution

AN1) Unfortunately, alternative awards cannot be issued based on University regulations. To the best of our knowledge, public universities in Cyprus cannot issue alternative awards to accommodate cases where students face difficulty in passing specific compulsory courses.

Areas of improvement and recommendations for PhD

No specific areas of improvement identified.

4. Learning resources and student support
(ESG 1.6)

Areas of improvement and recommendations for BSc
Q1) A more integrated campus would be desirable.

Actions Taken by the Institution
AN1) DCE fully agrees that a more integrated campus would be desirable. To address this issue, the Department actively communicates and expresses its needs for a more integrated campus to the authorities of the University through the Dean of the faculty, where DCE highlights the benefits of creating spaces and initiatives that facilitate interdisciplinary interactions, shared resources and collaborative opportunities among different departments and disciplines.

Based on the University's Strategic Plan DCE is expected to move to a new building in Veregaria area situated outside the city center of Limassol. However, the specific plan requires several years to materialize and until then DCE will be confined within the dispersed premises currently available in the main campus of CUT in the center of Limassol.

Areas of improvement and recommendations for PhD
Q2) A more integrated campus would be desirable.

Actions Taken by the Institution
AN2) Please see our response in AN1 above.

5. Additional for doctoral programmes
(ALL ESG)

Areas of improvement and recommendations
Q1) The final assessment of PhD thesis may enhance the involvement of subject experts from recognized external research environments.

Actions Taken by the Institution
AN1) According to the University's regulations, external members of the PhD dissertation Examination Committee must possess expertise relevant to the subject of the dissertation. Additionally, it is essential to avoid any conflict of interest between the student and external evaluators. Therefore, each member of the Examination Committee, apart from the Research Advisor, is required to submit a statement declaring any potential conflict of interest. The composition of the examination committee, including a declaration of the relevance of the research expertise of each member to the topic of the PhD Thesis, is approved first by the Departmental Board followed by the Faculty Board. To ensure that the members of the Examination Committee are indeed experts in the topic of the PhD Thesis, the research advisor should document their qualifications and expertise. This documentation should be presented in a comprehensive manner to the Departmental Board, providing detailed information about the external members' backgrounds and areas of specialization.
Thus, although University regulations already require the involvement of external subject experts in the PhD Examination Committee, the Department will further promote the inclusion of experts from recognized research environments to enhance the quality of the programme.

7. Eligibility (Joint programme)

(ALL ESG)

N/A

Areas of improvement and recommendations **by EEC**	Actions Taken by the Institution	For Official Use ONLY
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Click or tap here to enter text.	Click or tap here to enter text.	Choose level of compliance:

B. Conclusions and final remarks

Recommendations:

• Q1) Recruitment of more faculty with core-chemical-engineering competences
• Q2) Better integration of facilities within the same (or closely situated) buildings
• Q3) There seems not to be much consciousness among students about representation and how to exert influence on programs, this makes the students an under-utilized resource in the development of the programs
• Q4) Somewhat more emphasis on practical operation of chemical engineering processing systems at intermediate to larger scale
• Q5) Develop access to practical experiences with larger scale processing equipment. Internships may help with this, but then internships must not reduce to analytical work only

Actions Taken by the Institution

• AN1) DCE anticipates that two (2) more faculty members will be recruited in early 2024 and three (3) more by the end of 2025.
• AN2) DCE is expected to move to a new building in Veregaria area (outside the city center of Limassol) as specified in the Strategic Plan of CUT.
• AN3) Students can bring up issues through the three (3) student representatives in the Departmental Board. Subsequently, the Departmental Undergraduate Studies Committee, which oversees handling of various tasks related to Undergraduate studies and the curriculum, is responsible to either directly resolve the issues raised by students or to inform the Departmental Board aiming to seek for optimal solutions.
• AN4+5) Currently students participate in one (1) laboratory practical experience at the IESC Innovating Environmental Solutions Center Ltd (http://www.iesc-ltd.com/) which is located in Ypsonas in Limassol as part of the laboratory exercises which are included in the course CEN 302 “Chemical Technology Laboratory”. DCE will supplement the specific course with an additional laboratory exercise that will be conducted at a relevant industry. A very small number of Internships covering analytical work only will be eliminated.

C. Higher Education Institution academic representatives

Name	*Position*	*Signature*
Michalis Koutinas	Department Chair	
Alexandros Charalambides	Program Coordinator	Αλέξανδρος Χαραλαμπίδης
Ioannis Vyrides	Postgraduate Studies Committee	
Pavlos Stefanou	Undergraduate Studies Committee	Παύλος Στεφάνου
Achilleas Konstantinou	Undergraduate Studies Committee	Αχιλλέας Κωνσταντίνου
Click to enter Name	Click to enter Position	

Date: 10/8/2023

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