



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
HELLENIC REPUBLIC



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Accreditation Report

for the Postgraduate Study Programme of:

Product Design and Manufacturing

Department: Production Engineering and Management

Institution: Technical University of Crete

Date: 21 October 2023

Report of the Panel appointed by the HAHE to undertake the review of the Postgraduate Study Programme of **Product Design and Manufacturing** of the **Technical University of Crete** for the purposes of granting accreditation.

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PART A: BACKGROUND AND CONTEXT OF THE REVIEW

I. The External Evaluation & Accreditation Panel

The Panel responsible for the Accreditation Review of the postgraduate study Programme of **Product Design and Manufacturing** of the **Technical University of Crete** comprised the following five (5) members, drawn from the HAHE Register, in accordance with Laws 4009/2011 & 4653/2020:

- 1. Professor Emeritus Nicholas Kyriakopoulos**
The George Washington University, United States of America
- 2. Professor Ioannis Violaris**
City Unity College Nicosia, Cyprus
- 3. Professor Nikolas Xiros**
University of New Orleans, United States of America
- 4. Dr. Dimitris Kabilafkas**
OTE, Greece
- 5. Mr. Prodromos Minaoglou**
University of Western Macedonia, Greece

II. Review Procedure and Documentation

The Panel reviewed the material provided by HAHE (Hellenic Authority of Higher Education) in advance of the evaluation week. On Monday morning, 9/10/23, the Panel met remotely via Zoom with the following representatives of the TUC: Prof. Evangelos Grigoroudis, Dean of the PEM School, Prof. Georgios Karystinos, Dean of the Electrical and Computer Engineering School, Professor Ioannis Nikolos, Director of the PEM School, Professor Athanasios Liavas, Director of the ECE School, Professor Vassilios Kouikoglou, OMEA, of the PEM School, Professor Konstantinos Tsagarakis, OMEA of the PEM School, Professor Efthymios Koutroulis, OMEA, ECE School, Associate Professor Vassilios Samoladas, OMEA, ECE School. Present were the following members of MODIP: Associate Professor Fotios Kanellos, President of MODIP, Professor Michail Lagoudakis, Professor Doumpos, OMEA member of the PEM School, Ms. Andreani Lyroni, Staff.

During the presentations, the Panel received detailed briefings about the history of the Programme and its evolution to the present form. Professor Nikolos gave an overview of the Programme including purpose and expected learning outcomes. The emphasis was on the rationale for the development of the Programme and the needs it aims to satisfy. Subsequently, there were virtual visits to the facilities.

On Tuesday, again on Zoom, the Panel met with members of the teaching staff who discussed opportunities for professional development, workload, evaluation by the students, research activities and their involvement in research projects. The meeting was followed with one with students of the Programme who provided insight of their study experience and gave a very candid assessment of the Programme identifying strengths and weaknesses from their perspective.

Subsequently, the Panel met with recent graduates of the Programme who were pursuing careers in the private sector and provided some personal experience on the relevance of the Programme to their work in the private sector and impact of the Programme on their professional development.

The last meeting with stakeholders was with two heads of local companies who have close association with the Department and employ some of the graduates of the Programme. By far, they were the most enthusiastic about the scope, contents and utility of the Programme.

After the meeting with the external stakeholders, the Panel met with the Dean of the PEM School, the Director of the PSP and the members of OMEA and MODIP to provide a preliminary feedback on the findings of the evaluation.

Documentation provided to the Panel by the Institution:

- Purpose of the Programme.
- Quality policy identifying the targets of the Programme
- History and mission of the founded in 1984

- Description of courses relevant to the Programme listing expected learning outcomes, relevant skills and detailed course outlines.
- Description of laboratories associated with the Programme identifying faculty responsible for each laboratory, equipment and infrastructure, along with associated research activities.
- Description of mechanism for addressing student complaints.
- Description of the academic advising system.
- Copy of the Government Gazette describing the legal foundation and giving detailed description of the post Graduate Product Design and Manufacturing Programme.
- Copy of the Government Gazette establishing guidelines for the obtaining and managing funded research.
- Regulations guiding outreach activities such as Erasmus, practical training and continuing education.
- Report on the quality indicators regarding the structure and organization of the Programme of studies.
- Statistical information on the student evaluation of the performance of the teaching staff.
- Detailed description of the Programme including structure and organization, teaching staff and students.
- Updated quality policy including procedures and metrics for assessing implementation.
- Description of the organization of MODIP at the School level and OMEA at the Department level.
- Report of MODIP assessing the quality of the Programme and identifying areas for potential improvement.
- Detailed description of the curriculum.
- Report on the student evaluations for the academic years 2018-2019 to 2021-2022.

III. Postgraduate Study Programme Profile

The School of Production Engineering and Management was founded as a Department in 1983 and admitted students in 1984 for the purpose of providing engineers with the tools to solve technical problems and handle technical and management issues. The School has 25 four academic divisions with 25 faculty members and 21 Laboratory and Teaching personnel. The purpose of the MSc Programme is to further the education of the students in the new technologies of design, production and production management with the broader objective of contributing to the economic and technological development of the country.

The Programme has a duration of 1 year for full time students and 2 years for part time students leading to a Master of Science degree earning 75 credits (ECTS). It has been in operation since 2018 and has graduated 16 students. The School charges a tuition of 3.000€ for students within the European Union and 6.000€ for those outside.

During the meeting with the external stakeholders, the consensus was that there are ample opportunities for the graduates of the Programme in Greece as well beyond Greece in the private and public sector as well as in academia.

PART B: COMPLIANCE WITH THE PRINCIPLES

PRINCIPLE 1: QUALITY ASSURANCE POLICY AND QUALITY GOAL SETTING FOR THE POSTGRADUATE STUDY PROGRAMMES OF THE INSTITUTION AND THE ACADEMIC UNIT

INSTITUTIONS SHOULD APPLY A QUALITY ASSURANCE POLICY AS PART OF THEIR STRATEGIC MANAGEMENT. THIS POLICY SHOULD EXPAND AND BE AIMED (WITH THE COLLABORATION OF EXTERNAL STAKEHOLDERS) AT THE POSTGRADUATE STUDY PROGRAMMES OF THE INSTITUTION AND THE ACADEMIC UNIT. THIS POLICY SHOULD BE PUBLISHED AND IMPLEMENTED BY ALL STAKEHOLDERS.

The quality assurance policy of the academic unit should be in line with the quality assurance policy of the Institution and must be formulated in the form of a public statement, which is implemented by all stakeholders. It focuses on the achievement of special goals related to the quality assurance of the study programmes offered by the academic unit.

Indicatively, the quality policy statement of the academic unit includes its commitment to implement a quality policy that will promote the academic profile and orientation of the postgraduate study Programme (PSP), its purpose and field of study; it will realise the Programme's goals and it will determine the means and ways for attaining them; it will implement appropriate quality procedures, aiming at the Programme's improvement.

In particular, in order to implement this policy, the academic unit commits itself to put into practice quality procedures that will demonstrate:

- a) the suitability of the structure and organisation of postgraduate study programmes*
- b) the pursuit of learning outcomes and qualifications in accordance with the European and National Qualifications Framework for Higher Education - level 7*
- c) the promotion of the quality and effectiveness of teaching at the PSP*
- d) the appropriateness of the qualifications of the teaching staff for the PSP*
- e) the drafting, implementation, and review of specific annual quality goals for the improvement of the PSP*
- f) the level of demand for the graduates' qualifications in the labour market*
- g) the quality of support services, such as the administrative services, the libraries and the student welfare office for the PSP*
- h) the efficient utilisation of the financial resources of the PSP that may be drawn from tuition fees*
- i) the conduct of an annual review and audit of the quality assurance system of the PSP through the cooperation of the Internal Evaluation Group (IEG) with the Institution's Quality Assurance Unit (QAU)*

Study Programme Compliance

I. Findings

The Quality Assurance policy has been published and is publicly accessible in the website of the graduate Programme. A subheading of the document is "Statement of the Quality Policy for the Programs of the 2nd and 3rd Cycle of Studies". It is not stated explicitly whether the statement applies to the post-graduate Programme.

The document lists strategic goals and specifies explicit procedures for attaining them. The procedures are reviewed periodically by coordinating committees comprising representatives of the undergraduate and graduate programs, in cooperation with the School Assembly, OMEA and MODIP of the Technical University of Crete.

II. Analysis

The School has a reasonably well-articulated quality assurance policy and procedures for generating quantifiable results. It is not clear how the results of the analysis are used to improve the performance of the Programme.

One possible impediment to drawing valid conclusions from the data collected during the evaluations is the small number of students enrolled in the Programme combined with an even smaller number of responses.

III. Conclusions

The Quality Assurance Policy is reasonably well formulated and published. The lack of sufficient data due to the newness of the Programme does not allow to draw conclusions with a high level of confidence. It remains to be seen how it will impact the future performance of the Programme.

Panel Judgement

Principle 1: Quality assurance policy and quality goal setting for the postgraduate study programmes of the institution and the academic unit	
Fully compliant	
Substantially compliant	X
Partially compliant	
Non-compliant	

Panel Recommendations

To comply with quality assurance even in the absence of external evaluation.

PRINCIPLE 2: DESIGN AND APPROVAL OF POSTGRADUATE STUDY PROGRAMMES

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

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

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

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

In addition, the design of PSP must consider:

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

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

Study Programme Compliance

I. Findings

The School has established a clearly articulated quality assurance policy with focus on high quality education, encouragement of outreach and high-quality research. They are measured with established Key Performance Indicators.

The policy provides for regular review of the Programme of Studies on an annual basis with the objective of updating it and keeping it current with the technological developments in Greece and abroad, and addressing new problems that might arise. The policy is communicated to the stakeholders via the School website “Product Design and Manufacturing”.

Following the recommendation of the Faculty Senate on 10/7/2018, an undergraduate Programme in the subject area was established officially by the publication of the details of its operation in the Government Gazette on 9.10.2018 with duration through the Academic Year 2022-2023. A subsequent decision published in the Government Gazette on 9/8/2023 modified the previous decision and established the graduate Programme in its present form. The modified Programme is the subject of the present evaluation.

The duration of the Programme is one academic year comprising two semesters. There are nine courses in the first semester: two required, five elective and two seminars. In the second semester, there are two required courses, four elective and two seminars.

The School has provided a list of the faculty associated with the Programme. It includes areas of specialization, teaching loads, other teaching obligations. It also includes the individual websites which contain brief biographies, educational credentials and contact information.

The school has articulated a specific strategy for achieving the strategic goals that comprises continuing monitoring of the undergraduate Programme, strengthening the ties between education and research, systematic monitoring and standardization of the learning goals and outcomes, annual evaluation, electronic means to support the educational services, support of students through internships and encouragement to participate in the Erasmus Programme.

II. Analysis

It is difficult to provide a definitive assessment of the Programme due to the lack of sufficient data, given that it has been in operation for less than one year. Nevertheless, ignoring the references to the undergraduate Programme, the procedures described in the submitted documentation pertaining to the design and approval of the Programme meet the standards of performance.

III. Conclusions

The information submitted in support of the current request for accreditation frequently makes reference to the undergraduate Programme as is the case for School quality policy articulated in the website <https://www.pem.tuc.gr/en/the-school/quality-policy>

Panel Judgement

Principle 2: Design and approval of postgraduate study programmes	
Fully compliant	
Substantially compliant	X
Partially compliant	
Non-compliant	

Panel Recommendations

- Update the information related to the graduate Programme to remove all references to the undergraduate programs.
- Collect and evaluate data for at least two years of operation to achieve some semblance of confidence in the results.

PRINCIPLE 3: STUDENT-CENTRED LEARNING, TEACHING, AND ASSESSMENT

INSTITUTIONS SHOULD ENSURE THAT POSTGRADUATE STUDY PROGRAMMES PROVIDE THE NECESSARY CONDITIONS TO ENCOURAGE STUDENTS TO TAKE AN ACTIVE ROLE IN THE LEARNING PROCESS. THE ASSESSMENT METHODS SHOULD REFLECT THIS APPROACH.

Student-centred learning and teaching plays an important role in enhancing students' motivation, their self-evaluation, and their active participation in the learning process. The above entail continuous consideration of the Programme's delivery and the assessment of the related outcomes.

The student-centred learning and teaching process

- *respects and attends to the diversity of students and their needs by adopting flexible learning paths*
- *considers and uses different modes of delivery, where appropriate*
- *flexibly uses a variety of pedagogical methods*
- *regularly evaluates and adjusts the modes of delivery and pedagogical methods aiming at improvement*
- *regularly evaluates the quality and effectiveness of teaching, as documented especially through student surveys*
- *strengthens the student's sense of autonomy, while ensuring adequate guidance and support from the teaching staff*
- *promotes mutual respect in the student-teacher relationship*
- *applies appropriate procedures for dealing with the students' complaints*
- *provides counselling and guidance for the preparation of the thesis*

In addition

- *The academic staff are familiar with the existing examination system and methods and are supported in developing their own skills in this field.*
- *The assessment criteria and methods are published in advance. The assessment allows students to demonstrate the extent to which the intended learning outcomes have been achieved. Students are given feedback, which, if necessary is linked to advice on the learning process.*
- *Student assessment is conducted by more than one examiner, where possible.*
- *Assessment is consistent, fairly applied to all students and conducted in accordance with the stated procedures.*
- *A formal procedure for student appeals is in place.*
- *The function of the academic advisor runs smoothly.*

Study Programme Compliance

I. Findings

The Programme has made progress in implementing student-centred learning, teaching, and assessment. Due to the Covid-19 pandemic, that caused shutdowns and required moving classes online, an increased pace in implementing this principle was observed. However, the Programme independently even without considering the pandemic seems to be moving in the right direction.

II. Analysis

Student-Centered Teaching and Learning focuses on the needs, abilities, interests, and learning styles of the students and has many implications for the design of curriculum, course content, and interactivity of courses. Accordingly, a prominent pedagogy will be teacher-as-coach, to provoke students to learn how to learn and thus to teach themselves, rather than the more traditional teacher-centered learning with teacher-as-deliverer-of-instructional-services, which places the teacher at its centre in an active role and students in a passive, receptive role. This pedagogy acknowledges student voice as central to the learning experience for every learner and requires students to be active, responsible participants in their own learning.

To capitalize on this, teaching and learning should be personalized to the maximum feasible extent. Decisions about the details of the course of study, the use of students' and teachers' time, and the choice of teaching materials and specific pedagogies must be unreservedly placed in the hands of the staff and students.

III. Conclusions

The Principle requirements are essentially met but improvements are recommended to be implemented and monitored.

Panel Judgement

Principle 3: Student-centred learning, teaching, and assessment	
Fully compliant	
Substantially compliant	X
Partially compliant	
Non-compliant	

Panel Recommendations

Here are some suggestions to further improve with respect to Principle 3:

- Students take leadership in classroom, present their work, and facilitate groups.
- Students take ownership of their technical and management skills and learning to develop, test, and refine their thinking.
- Students engage in talk that is accountable to the text or task, the learning community, and standards of reasoning. Learning is negotiated and directed by students.
- The content and delivery of instruction is culturally responsive and respects and builds on the diverse resources and experiences of learners in the classroom.

- Students work in flexible, cooperative groupings to solve problems and analyse literature to demonstrate understanding of a task or concept through multiple perspectives.
- Students consistently develop their own reasoning around concepts and ideas and can articulate the processes and thinking they engaged in while grappling with a task or idea.
- Students listen to one another as well as to their instructors, and they exchange different ideas to build upon and apply new learning and approaches to their own understanding of a concept or idea that increase in complexity.

PRINCIPLE 4: STUDENT ADMISSION, PROGRESSION, RECOGNITION OF POSTGRADUATE STUDIES, AND CERTIFICATION

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

All the issues from the beginning to the end of studies should be governed by the internal regulations of the academic units. Indicatively:

- *the student admission procedures and the required supporting documents*
- *student rights and obligations, and monitoring of student progression*
- *internship issues, if applicable, and granting of scholarships*
- *the procedures and terms for the drafting of assignments and the thesis*
- *the procedure of award and recognition of degrees, the duration of studies, the conditions for progression and for the assurance of the progress of students in their studies*
- *the terms and conditions for enhancing student mobility*

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

Study Programme Compliance

I. Findings

Each student admitted to the master's degree Programme chooses one of the two available ways of pursuing the master's degree. The first way of attending is full-time and has a duration of one year (2 semesters + thesis). The second way of attending is part-time and has a duration of two years (4 semesters + thesis).

The postgraduate Programme is multidisciplinary as the students who choose to continue their studies with the specific Programme come from different university departments either in Greece or abroad. More specifically, the master's degree is aimed mainly at schools of mechanical engineering and production and management engineering.

The basic obligation of students is to attend the courses in which they register. For the evaluation of each student, both his participation in the class and his performance in homework exercises are taken into account. More specifically, each lecturer announces the method of assessment in the beginning of the class. Final examinations, in-class assignments and term papers are some of the tools available to the instructors to assess their students. The final grade is expressed on a decimal scale, from 0 to 10, with passing grade 6.0.

The ECTS system is applied to the curriculum. More specifically, in each semester, students are invited to attend 2 compulsory and 2 optional courses. The 2 electives can be replaced by 1 elective

and 2 seminars. Each compulsory or elective course is carrying 7.5 ECTS credits while each seminar is carrying 2.5 or 5 ECTS credits. The aim of each semester is to complete 30 ECTS credits.

To complete their studies, students must complete 75 ECTS credits. The total ECTS credits of the 2 semesters are 60 (30+30) and the thesis' credits are 15 ECTS. In this way students can complete the 75 ECTS credits

The study Programme offers its candidates a study guide that contains all the information needed by each candidate as well as each student attending the Programme.

II. Analysis

Students may enrol in the Programme selecting one of two methods of matriculation, full-time or part-time. Once a student chooses a particular method of matriculation, he/she needs to complete his/her studies under that method of matriculation. This is reflected in a binding declaration.

The entire registration process for a new student is done online through the university's platform.

A large part of the students who choose to continue to the master's degree are graduates of the same school. A basic criterion for the acceptance of an application of an admitted student to the master's degree is the possession of a similar undergraduate qualification to that of the master's degree itself.

As mentioned above, each student has the possibility to choose either 2 elective courses or 1 elective course and 2 seminars. In the case of choosing 1 elective course and 2 seminars, one of the 2 seminars that the student will declare must have 5 ECTS credits so that he can complete the 30 ECTS credits in each semester. If this is not possible, the student must register at least for 3 seminars along with 1 elective course.

The study guide contains detailed information on registration and declaration of courses, duration of study, available courses, student evaluations, students' rights and obligations and additional information that someone needs to consider in choosing the specific postgraduate Programme.

III. Conclusions

The two ways of following the master's Programme offer students greater flexibility regarding their daily schedule. In cases where the student is working, he/she has the possibility to study part-time, while if his/her Programme is more flexible, he/she can study the full-time Programme.

Using online registration makes it even easier for a prospective student to submit their paperwork to enrol in the master's Programme. Course choose and seminar availability enable students to tailor the curriculum according to their particular need and interest to them.

Panel Judgement

Principle 4: Student admission, progression, recognition of postgraduate studies and certification	
Fully compliant	X
Substantially compliant	
Partially compliant	
Non-compliant	

Panel Recommendations

None.

PRINCIPLE 5: TEACHING STAFF OF POSTGRADUATE STUDY PROGRAMMES

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

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

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

Study Programme Compliance

I. Findings

The faculty and staff of the Programme is adequate regarding technical aspects of product design and development. However, there seems to be a shortage of faculty or instructional staff management, operational research and legal/law aspects pertaining to product development and design.

II. Analysis

The sciences and engineering of production systems, decision systems, administration and management of complex and overlaid technoeconomic systems as well as the preparation of engineers with skills and training to design systems, products and services. Particularly, a production engineering and product design degree Programme has to include coursework in logistics and supply chain management, quality control, materials and operations management.

Production engineering and product design Programme students study cost analysis, inventory control and other areas of production to improve efficiency, eliminate waste and reduce costs. Courses such as quality control provide the engineering student with an education in the tools that manufacturing organizations use to identify quality problems. Degree programs should also include courses in the principles of lean manufacturing, which encourages waste elimination and cost reduction.

III. Conclusions

The Principle requirements are essentially met but improvements are recommended to be implemented and monitored.

Panel Judgement

Principle 5: Teaching staff of postgraduate study programmes	
Fully compliant	
Substantially compliant	X
Partially compliant	
Non-compliant	

Panel Recommendations

The Panel suggests considering faculty or instructors in the following areas/fields:

- Business management and logistics
- Operational research
- Legal aspects of product development incl. patent and patent infringement, copyright etc.

PRINCIPLE 6: LEARNING RESOURCES AND STUDENT SUPPORT

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

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

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

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

Study Programme Compliance

I. Findings

Postgraduate students have the possibility to use the available services of the university such as the university library, eClass, laboratory equipment etc.

The secretarial support of postgraduate students is carried out entirely electronically through an electronic platform. More specifically, students are informed through the platform of any request they have submitted. Also, the students have the possibility to receive through the platform useful documents such as certificates, detailed grades. The advising system guides and supports the students from the time of their admission until their graduation.

The master's degree Programme has laboratory facilities where students can come into contact with many laboratory equipment. More specifically, as part of a course related to robotics, a laboratory has been created which houses modern equipment. This equipment consists of autonomous robotic systems of various types, training arms, prototyping devices (3D printers, CNC), electronic equipment and high-performance computers.

During the meeting of the committee with the students who completed the study Programme and are now working in the same field in the industry, the students expressed their views on how they feel as holders of this diploma. All the graduates feel that in comparison to their colleagues of other polytechnics, they feel that they have more knowledge and as a result they have more confidence both in finding employment and in the working environment.

II. Analysis

The eClass is student-friendly and allows them to upload their assignments as well as receive announcements and further instructions on the work to be done.

During a discussion with the members of the postgraduate Programme, a reference was made to the need for additional auxiliary secretarial staff. At the same time, from the discussion held with students attending the postgraduate Programme, a comment was made regarding the offering of elective courses. Elective courses are announced at the beginning of each academic year. This procedure does not allow them to plan their Programme well in advance.

Consequently, there were students who, when registering for the master's degree, either did not know about it or thought that the optional courses would be activated in the next academic year.

III. Conclusions

It is a very positive feature that students have access to the university's services and the possibility of fully electronic secretarial support is provided. The master's degree has the ability to offer modern equipment and laboratory space to students who want to be engaged more. It is also very important that the graduates feel that they have gained a lot of knowledge and confidence after completing the Programme and their contact with the industry.

Panel Judgement

Principle 6: Learning resources and student support	
Fully compliant	X
Substantially compliant	
Partially compliant	
Non-compliant	

Panel Recommendations

The schedule of offering the elective courses needs to be announced well in advanced of each academic year.

PRINCIPLE 7: INFORMATION MANAGEMENT

INSTITUTIONS BEAR FULL RESPONSIBILITY FOR COLLECTING, ANALYSING AND USING INFORMATION, AIMED AT THE EFFICIENT MANAGEMENT OF POSTGRADUATE STUDY PROGRAMMES AND RELATED ACTIVITIES, IN AN INTEGRATED, EFFECTIVE AND EASILY ACCESSIBLE WAY.

Institutions are expected to establish and operate an information system for the management and monitoring of data concerning students, teaching staff, course structure and organisation, teaching and provision of services to students.

Reliable data is essential for accurate information and decision-making, as well as for identifying areas of smooth operation and areas for improvement. Effective procedures for collecting and analysing information on postgraduate study programmes and other activities feed data into the internal system of quality assurance.

The information collected depends, to some extent, on the type and mission of the Institution. The following are of interest:

- *key performance indicators*
- *student population profile*
- *student progression, success, and drop-out rates*
- *student satisfaction with their programmes*
- *availability of learning resources and student support*

A number of methods may be used to collect information. It is important that students and staff are involved in providing and analysing information and planning follow-up activities.

Study Programme Compliance

I. Findings

In the context of the implementation of the Programme quality policy, the School of P.E.M. collects and analyses various pieces of information, with the aim of monitoring the operation of the Programme, as well as the continuous improvement of the services provided, applying various procedures, and using respective tools for collecting the information.

- Information about students

The basic system for the collection of information and the monitoring of the course of the study of postgraduate students is the student registry, operated by the Secretariat of the School used by all Schools of the University.

The student register collects data on incoming students yearly, total enrolled students and graduating ones. It also collects and stores data on students' elective courses, course grades for each semester, with the purpose of formulating recommendations to the Assembly during its periodic reforms of the study Programme. Students have access, with their personal credentials, to their grades and course registrations.

In addition, these elements are used for the organization of academic work, such as the allocation of rooms for teaching and examinations.

At the same time, the Secretariat of the School, in collaboration with OM.E.A. and the Programme's Panel, ensure that the data of the student register to feed the census reports of the Ministry of Education and the Integrated National Quality Information System (ICESP) of the ETH.A.A.E. Quantitative performance indicators are extracted to monitor the performance of the quality policy and the achievement of the School's goals, on the basis of the established KPI's.

Finally, in conjunction with the electronic student registry, the Secretariat uses an integrated electronic system for the provision of various secretariat and welfare services to students, such as the issue of certificates, the issuance of grade reports, copies of diplomas, diploma supplement, etc.

- Evaluation of the educational process

Data for the evaluations of courses by the students are collected. This process is implemented around the 10th week of each academic semester, through electronic questionnaires, which are filled out anonymously by the students on the eClass platform. Through questionnaires of which information is collected on the participation of students in the educational process, the educational materials provided to students, the quality of laboratory/tutorial courses, the learning outcomes, and the educational teacher effectiveness is achieved. The evaluation process is organized by OM.EA. in collaboration with MO.D.I.P. of Technical University of Crete.

At the end of each academic year the results are processed by the O.M.E.A. and are communicated to the Dean and the lecturers. In addition, the results are presented by the O.M.E.A. in the School Assembly, where they are discussed in order to identify problems and continuous improvement of both the collection process of the evaluation questionnaires courses, as well as the educational work provided.

The number of completed questionnaires is low, only 26% are returned. There are concerns about the reliability of the results in small classes and thus, a provision exists for no survey in classes of fewer than 5 students. However, students seem not to share these reservations.

- Syllabus

The online platform of course outlines, maintained in the MODIP site provides detailed information to students for all Programme courses, in a standardized format, according to the standards of ETHAA.E. OM.EA. and S.E.

- Alumni Information

Under the care of the School Secretariat, the electronic student records contain personal contact details of the graduates of the Programme (e.g. CVs and a global location map), optional. However, this public page is not clearly linked in the Programme's web sites.

This data is used to create a graduate file, which is used in various events held by the School with the participation of the graduates. It must be noticed that, according to the decision of the Technical University of Crete, the graduates keep their institutional email even after graduation, which facilitates communication with the graduates of Programme.

Additionally, the Technical University of Crete operates the TUC Alumni community, which aims to cultivate relations of solidarity between the Foundation and its graduates, to contribute to the advancement of its members and to promote its work and promote its work.

II. Analysis

The course process is monitored by an information system and the quality tools of the Internal Quality Assurance System and the Hellenic Authority for Higher Education.

However, it is not clear in which degree these data are analysed for the detection of possible drawbacks in the Programme.

III. Conclusions

The Programme is supported by a regular information management system that could be further enhanced with analysis capabilities.

Low participation in students' questionnaires.

Panel Judgement

Principle 7: Information management	
Fully compliant	X
Substantially compliant	
Partially compliant	
Non-compliant	

Panel Recommendations

- Increase participation in students' questionnaires.
- Consider upgrading the information system with further analysis capabilities.

PRINCIPLE 8: PUBLIC INFORMATION CONCERNING THE POSTGRADUATE STUDY PROGRAMMES

INSTITUTIONS SHOULD PUBLISH INFORMATION ABOUT THEIR TEACHING AND ACADEMIC ACTIVITIES RELATED TO THE POSTGRADUATE STUDY PROGRAMMES IN A DIRECT AND READILY ACCESSIBLE WAY. THE RELEVANT INFORMATION SHOULD BE UP-TO-DATE, OBJECTIVE AND CLEAR.

Information on the Institutions' activities is useful for prospective and current students, graduates, other stakeholders, and the public.

Therefore, Institutions and their academic units must provide information about their activities, including the PSP they offer, the intended learning outcomes, the degrees awarded, the teaching, learning and assessment procedures applied, the pass rates, and the learning opportunities available to their students. Information is also provided on the employment perspectives of PSP graduates.

Study Programme Compliance

I. Findings

The Programme utilizes its own website at <https://www.prodes.pem.tuc.gr/el/archi>, (pointed also from the department's and the university's website), whereas additional crucial information is maintained in the School's website, <https://www.pem.tuc.gr/el/archi>, that is considered as its primary communication channel. This website contains information on:

- The School, its history, the administrative bodies, the structure of the School (sectors) and the professional rights of graduates.
- The offered study programs (P.P.S., postgraduate programs, PhD studies, and lifelong learning programmes), as well as about postdoc research capabilities.
- The research activity of the School with an emphasis on the presentation of the laboratories and the activity they develop.
- The staff of the School (teaching, administrative, laboratory teaching staff, and special technical laboratory staff). For all members of D.E.P teaching staff there are short CV's, their teaching assignments, while there are also links to their personal websites, if available. Information is also given about emeritus-retired professors, honorary professors and Ph.D. graduates of the School.
- The School's quality policy and all related material, such as internal reports and external evaluations of previous years, as well as reports with the results of the course evaluation process.
- Other information and useful material such as application and certification documents for undergraduate and postgraduate students, as well as for the staff of the School, links to other services of the University that provide welfare services to them students, a map of the School's building infrastructure, as well as links to the website of the relative trade union of production &

management engineers. News and announcements on all current issues and activities of the School, such as issues related to the operation of the P.P.S. and of P.M.S. organized by the School, the presentation of Diplomas, Master's Theses and Doctorates Dissertations, announcements of positions, and the research activity of the School (research results, distinctions, scientific events, etc.).

In addition, the Programme's website contains info on:

- The objectives, the organization and the operation of the P.M.S.
- The admission process, the criteria and the application evaluation process.
- The courses offered.
- The study regulations.
- The distance learning platform and online services available to students.
- The administrative bodies of the P.M.S. and the teaching staff.
- The timetable and the academic calendar.
- News and announcements.
- Tuition fees and scholarship regulation.
- Information on the student welfare provided (food, accommodation).
- Various documents, such as applications for the approval of a Master Diploma topic.
- Record of project evaluations, various certificates and application forms for suspension/extension of studies.

Both sites appear updated. The maintenance is administered and performed by members of the staff. The public relations unit and other special committees feed new material.

An important part of the Department's website is also available in English. The Programme's website contains very little info in English, especially the courses' description. There is no general language switch displayed.

The Programme and the department are not listed in the Hellenic Academic Research Data Management Initiative. (<https://hardmin.heal-link.gr>).

It is also noted that there is a special Facebook page for the Programme (maintained by the department). This page is utilized for displaying news about the operation and the activities of the Programme. There is no direct access to it from the Programme's site

Finally, every year informative events are organized to promote the Programme (e.g. "virtual info weeks" for anyone interested in the Programme. The events are scheduled close to the application deadline for the registration. Until 2019, these events were held live on the premises of the School, while from 2020 they take place electronically in the form of webinars.

These webinars are recorded and are available on-line to anyone interested, through the above page on Facebook, as well as the channel that the Liaison Office of the University maintains on YouTube.

II. Analysis

The Programme's site displays the basic necessary info for its structure and operations. The first and main drawback to be noticed is the lack of full English support (especially in the Programme's site), that is especially crucial for a Programme that hopes to swift into "internationalization". Whereas the info in English may exist in some "corner", the occasional non-Greek speaking visitor will leave after the first pages s/he comes across.

Another drawback is about the organization of the material. Some items are not in the place where one expects intuitively to be found (e.g. labs description, link to Facebook page for the events etc). Without duplicating the material, some more tabs could lead to the right place for finding the info. In a similar way, before updating the whole Programme's site with English version, a single note like 'for more info in English press' in a striking place of the home page could temporarily help.

Detailed information on the taught courses is provided online via eClass asynchronous distance learning platform, but is not public. A procedure might be considered to provide limited -time access to visitors who are seriously interested.

The Facebook page contains interesting material that, in part, should also have a place in the main Programme's site. The main scope for serving as a newsletter is justified, however, there are some doubts how flexible it is when maintained by a third party.

The Programme should establish an official presence in more appropriate scientific and professional networks like IEEE (e.g. by establishing a student branch), IEE and LinkedIn.

III. Conclusions

The Programme publishes information about its structure and its teaching and academic activities. However, it is necessary this info to be better organized and more easily accessed in order to reach a broader and an international audience.

Panel Judgement

Principle 8: Public information concerning the postgraduate study programmes	
Fully compliant	
Substantially compliant	X
Partially compliant	
Non-compliant	

Panel Recommendations

- Restructure the information of the two sites (Programme's and School's) and the social media channels and provide links between them for easy navigation.
- Full support of English, especially for material relevant to potential foreign candidates and international collaborations.

PRINCIPLE 9: ON-GOING MONITORING AND PERIODIC INTERNAL EVALUATION OF POSTGRADUATE STUDY PROGRAMMES

INSTITUTIONS AND ACADEMIC UNITS SHOULD HAVE IN PLACE AN INTERNAL QUALITY ASSURANCE SYSTEM FOR THE AUDIT AND ANNUAL INTERNAL REVIEW OF THEIR POSTGRADUATE STUDY PROGRAMMES, SO AS TO ACHIEVE THE OBJECTIVES SET FOR THEM, THROUGH MONITORING AND POSSIBLE AMENDMENTS, WITH A VIEW TO CONTINUOUS IMPROVEMENT. ANY ACTIONS TAKEN IN THE ABOVE CONTEXT SHOULD BE COMMUNICATED TO ALL PARTIES CONCERNED.

The regular monitoring, review, and revision of postgraduate study programmes aim at maintaining the level of educational provision and creating a supportive and effective learning environment for students.

The above comprise the evaluation of:

- a) the content of the programme in the light of the latest research in the given discipline, thus ensuring that the PSP is up to date*
- b) the changing needs of society*
- c) the students' workload, progression and completion of the postgraduate studies*
- d) the effectiveness of the procedures for the assessment of students*
- e) the students' expectations, needs and satisfaction in relation to the programme*
- f) the learning environment, support services, and their fitness for purpose for the PSP in question*

Postgraduate study programmes are reviewed and revised regularly involving students and other stakeholders. The information collected is analysed and the programme is adapted to ensure that it is up-to-date.

Study Programme Compliance

I. Findings

The Panel has determined that the university has in place the legally necessary bodies (QAU/MODIP) that are monitoring on an on-going basis the quality of the postgraduate Programme. These quality assurance processes are internally taking place through the necessary personnel that gathers information from the department offering the Programme of study.

This is done through a self-assessment procedure and takes place annually as necessitated by the IQAS.

The outcomes of the assessment are properly recorded and disseminated to the academic and administrative personnel.

As needed, corrective measures are taken through action plans that are drafted following meetings of the Deans, Department Heads and teaching staff.

II. Analysis

Key performance indicators (KPIs) are set to evaluate the performance at all levels, for instance research achieved, teaching competences, student support, student orientation, guidance to students for further studies and/or employment opportunities.

Advisors are appointed and an open - door policy is in place.

Given the relatively small number of students, lecturers are in constant contact with their students and thus are able to address any issues arising efficiently and effectively.

III. Conclusions

The Panel believes that this Principle is currently substantially compliant and that in the next few years it can become fully compliant as all involved are determined to achieve further excellence.

Panel Judgement

Principle 9: On-going monitoring and periodic internal evaluation of postgraduate study programmes	
Fully compliant	
Substantially compliant	X
Partially compliant	
Non-compliant	

Panel Recommendations

- We recommend regular internal meetings of the faculty with external stakeholders so as to get first hand feedback on the industry's ever-changing needs that have to be reflected in the curriculum (Advisory Board).
- Furthermore, we also recommend more regular meetings of the QAU with faculty members so as to establish a two-way exchange of views on quality related matters.
- Additionally, the students' evaluations, could be more meaningful if they take place at the end of the first semester so as to allow the department to consider improvements that can be applied during the next two semesters.
- Finally, we believe students' representatives should be given more opportunities to express their views and suggestions.

PRINCIPLE 10: REGULAR EXTERNAL EVALUATION OF POSTGRADUATE STUDY PROGRAMMES

THE POSTGRADUATE STUDY PROGRAMMES SHOULD REGULARLY UNDERGO EVALUATION BY PANELS OF EXTERNAL EXPERTS SET BY HAHE, AIMING AT ACCREDITATION. THE TERM OF VALIDITY OF THE ACCREDITATION IS DETERMINED BY HAHE.

HAHE is responsible for administrating the PSP accreditation process which is realised as an external evaluation procedure, and implemented by panels of independent experts. HAHE grants accreditation of programmes, based on the Reports delivered by the panels of external experts, with a specific term of validity, following to which, revision is required. The quality accreditation of the PSP acts as a means for the determination of the degree of compliance of the programme to the Standards, and as a catalyst for improvement, while opening new perspectives towards the international standing of the awarded degrees. Both academic units and Institutions must consistently consider the conclusions and the recommendations submitted by the panels of experts for the continuous improvement of the programme.

Study Programme Compliance

I. Findings

The teaching staff is fully aware of the importance of regular external evaluations; most of them having studied abroad, are aware of the purpose of this procedure and the benefits it brings about in developing an ever-improving Programme of study.

The stakeholders related to the Programme are also aware of the contribution of this process in improving the Programme's quality in a very competitive environment.

Follow-up actions are in place and do take place soon after an external evaluation is communicated to the department.

II. Analysis

The outcomes of the external evaluation are discussed at the faculty committee level and all suggestions of external evaluators are seriously taken into consideration. Alas some of the suggestions cannot be implemented due to budget constraints.

The PSP under review has not been evaluated by any other Agency, besides the evaluating committees that HAHE is appointing.

Yet, the Programme's faculty as well as their research activities are constantly evaluated at European and International conferences at which they are often highly praised.

III. Conclusions

Given the above the Panel considers that this Principle is fully compliant.

Panel Judgement

Principle 10: Regular external evaluation of postgraduate study programmes	
Fully compliant	X
Substantially compliant	
Partially compliant	
Non-compliant	

Panel Recommendations

- Seek additional evaluations other than the ones HAHE organizes.
- Aim in achieving additional international recognition.

PART C: CONCLUSIONS

I. Features of Good Practice

- Encouraging students to be admitted to directly contact Professors who can accept them to work with them in research related studies.
- Actively applying theory in practical projects.

II. Areas of Weakness

- The Erasmus project is not adequately encouraged.
- The QAU has only recently been activated.

III. Recommendations for Follow-up Actions

It is suggested that the improvements to the Programme could be made in the following areas (not necessarily in order of priority):

- Restructure the information of the two sites (Programme's and School's) and the social media channels and provide links between them for easy navigation.
- Full use of English, especially the material which is relevant to potential foreign candidates and international collaborations.
- To comply with quality assurance, even in the absence of external evaluation.
- Consider introduce material in the following areas: Business management and logistics; Operational research; Legal aspects of product development incl. patent and patent infringement, copyright etc.
- Hold regular internal meetings of the faculty with external stakeholders to get first hand feedback on the industry's ever-changing needs that have to be reflected in the curriculum (Advisory Board)
- Hold regular meetings of the QAU with faculty members so as to establish a two-way exchange of views on quality related matters.
- The students' evaluations, would be more meaningful if they take place at the end of the first semester so as to allow the department to consider improvements that can be applied during the next two semesters.
- Students' representatives should be given more opportunities to express their views and suggestions.
- Increase participation in students' questionnaires.
- Upgrade the information system with further analysis capabilities.
- Announce the schedule of elective courses' offering well in advance of each academic year.

- Implement actions as suggested in detail under Principle 3 to enhance student-centred learning, teaching, and assessment.

IV. Summary & Overall Assessment

The Principles where full compliance has been achieved are: **4, 6, 7, 10.**

The Principles where substantial compliance has been achieved are: **1, 2, 3, 5, 8, 9.**

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

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

Overall Judgement

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

The members of the External Evaluation & Accreditation Panel

Name and Surname

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