Accreditation Report
for the Undergraduate Study Programme
(Integrated Master) of:

Production Engineering and Management

Institution: Technical University of Crete
Date: 17 June 2023
Report of the Panel appointed by the HAHE to undertake the review of the Undergraduate Study Programme (Integrated Master) of Production Engineering and Management of the Technical University of Crete for the purpose of granting accreditation.
### Abbreviations

<table>
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<tr>
<th>Abbreviation</th>
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<tr>
<td>ECTS</td>
<td>European Credit Transfer and Accumulation System</td>
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<td>EEAP</td>
<td>External Evaluation &amp; Accreditation Panel</td>
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<td>EHEA</td>
<td>European Higher Education Area</td>
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<td>ENQA</td>
<td>European Association for Quality Assurance in Higher Education</td>
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<td>ESG</td>
<td>Standards and Guidelines for Quality Assurance in the European Higher Education Area</td>
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<td>EUA</td>
<td>European University Association</td>
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<td>GSRT</td>
<td>General Secretariat of Research and Technology</td>
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<td>GDPR</td>
<td>General Data Protection Regulation</td>
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<td>HQA</td>
<td>Hellenic Quality Assurance &amp; Accreditation Agency in Higher Education</td>
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<td>HAHE</td>
<td>Hellenic Authority for Higher Education</td>
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<td>HEIs</td>
<td>Higher Education Institutions</td>
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<td>IM</td>
<td>Integrated Master</td>
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<td>IQAS</td>
<td>Internal Quality Assurance System</td>
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<td>ISO</td>
<td>International Organization for Standardization</td>
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<td>KPIs</td>
<td>Key Performance Indicators</td>
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<td>MODIP</td>
<td>Quality Assurance Unit</td>
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<td>MOOCS</td>
<td>Massive On-line Open Courses</td>
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<td>NISQA</td>
<td>National Information System for Quality Assurance in Higher Education</td>
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<td>OMEA</td>
<td>Internal Evaluation Groups/School’s Internal Evaluation Committee</td>
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<td>QAU</td>
<td>Quality Assurance Unit</td>
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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 Undergraduate Study Programme (Integrated Master) of Production Engineering and Management 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. Prof. Kimon P. Valavanis (Chair)
   University of Denver, USA

2. Prof. Konstantinos Salonitis
   Cranfield University, United Kingdom

3. Prof. Andreas Efstathiades
   European University Cyprus, Cyprus

4. Mr. Pavlos Kalenderoglu
   Representative, Technical Chamber of Greece

5. Mr. Sarantis Antoniou, Student
   Democritus University of Thrace
II. Review Procedure and Documentation

The Hellenic Authority for Higher Education (HAHE) formed the External Evaluation and Accreditation Panel (EEAP) of experts to evaluate the programme of the School of Production Engineering and Management, PEM (Σχολή Μηχανικών Παραγωγής και Διοίκησης, ΜΠΔ) of the Technical University of Crete, TUC (Πολυτεχνείο Κρήτης) in accordance with the HAHE requirements. The evaluation and assessment were conducted remotely via Zoom (teleconferences). The method used was based on sampling of the School’s activities with the aim to evaluate the overall mission and objectives of the programme and to comment on its compliance, effectiveness, efficiency, and applicability with respect to the chosen requirements.

The review procedure and documentation were carried out during the week of June 12 to June 17, 2023.

During all meetings valuable information was received regarding the programme structure, delivery methods, programme improvements and modernization compared to findings from the previous external evaluation, which included a review of the undergraduate programme, the quality of the students and of the educational programmes, points of strength, as well as the shortcomings that needed to be addressed.

On June 12, 2023

The EEAP members met first, via teleconference, reviewed, and discussed all received information and the guidelines of HAHE as well as the logistics associated with the compilation of the report. The EEAP members, after detailed discussion, distributed the tasks among themselves based on the accreditation template.

Then, the EEAP members met via teleconference with the Vice-Rector, the Dean of the School, the President of MODIP and representatives of MODIP, MODIP staff, and OMEA. The meeting was well-coordinated, and informative; all representatives gave comprehensive and detailed presentations related to the status of the University and of the School. The presentations were followed by discussion and a Q&A (question and answer) session.

The first day concluded with a second meeting of the EEAP members (via teleconference), in which first impressions were discussed along with follow-up questions, which were registered for further clarification.

On June 13, 2023

The EEAP members met (via teleconference) with teaching staff members and discussed the programme of study, infrastructure support, and other resources. This meeting was followed by a meeting with undergraduate students, during which students provided comments about the overall programme of study, their experience, and support facilities. Moreover, the students commented on their involvement in setting and reviewing quality assurance metrics and program modifications, as well as their interaction with faculty, staff, and administrators.

Then, the EEAP members were given virtual tours of the facilities along with presentations that focused on basic/fundamental and applied research and development conducted by faculty, researchers and staff members, undergraduate and graduate students.
Last, the EEAP members met with employers and social partners, OMEA and MODIP representatives, followed by exit meetings with OMEA and MODIP staff and representatives to clarify any remaining issues and to respond to any questions the committee had. Subsequently, the meeting concluded with a teleconference with the Vice-Rector, the President of MODIP, the Dean of the School, OMEA and MODIP members, during which the committee discussed their first findings and communicated their overall positive impression.

**On June 14, 15, and 16, 2023**

The EEAP members worked to complete the accreditation / evaluation report.

Moreover, the committee acknowledges the efforts and hard work since 2012, the progress is evident, the curriculum is more streamlined and more flexible. Overall, the School is excellent despite the challenges and regulations imposed by the State.
III. Study Programme Profile

The programme under evaluation is administered by the School of Production Engineering and Management, or in Greek, Σχολή Μηχανικών Παραγωγής και Διοίκησης (ΜΠΔ). The School was first evaluated by ΑΔΙΠ, according to the N3374/2005 Law in September of 2012. Since then, the School completed five internal evaluations during the period 2015-2020; the last one was completed during the 2019-2020 Academic Year. The submitted report by the School for accreditation of the undergraduate programme, reports that about 85% of the suggestions and recommendations made by the previous EEAP members have already been considered and implemented.

Based on the current curriculum programme, to obtain the diploma in PEM, students must complete 56 courses (five less than those previously required, i.e., 61). 43 courses are compulsory (required). 2 courses are foreign language courses, English or German. 11 courses are elective courses. Students may choose the 11 elective courses from a list of 41 elective courses that are offered. Elective courses are grouped in six scientific directions.

The curriculum spans a five-year, ten-semester programme, course-heavy but diverse, which includes laboratory training, project work, a diploma thesis, and offers opportunities for practical training. The diploma thesis (Διπλωματική Εργασία) is completed during the 10th semester, and it is mandatory. The number of students involved in practical training (non-mandatory) depends on the available open seats every year; during the pandemic, the number of involved students decreased, however, there is currently increasing interest on behalf of the students for practical training. The interested students apply for practical training, and they are chosen by a committee.

The School of PEM is organized in four sectors (Τομείς).

Science Department: Its purpose is the scientific training of the School's students in subjects concerning basic knowledge. It promotes research in the areas of applied mathematics, physics, chemistry, engineering, and social sciences.

Production Systems: The focus is on the theory of production systems (systems reliability, project planning, analysis and optimization of production systems, energy analysis, etc.), as well as modern production technology (flexible production systems, robotics, automatic control, computer aided design, materials management, environmental technology, thermodynamics, fluid mechanics, etc.).

Decision Science Sector: The focus is on the development of business research methods and techniques that aim to assist in business decision-making processes, design and control of production systems, telematics applications and service provision.

Organization and Management: The focus is on administrative processes and organizational functions and include, among others, systems management, financial analysis, marketing, ergonomics and work safety, financial management, project management, information systems, e-business, artificial intelligence, service quality, contract management, technology-based financing, etc.

The School has developed and implemented a well-structured algorithm for students to choose courses from the main area and specializations. It is also possible for students to have a major
and minors during the curriculum. Collectively, courses cover a very wide range of topics from fundamental courses to more advanced elective courses. The curriculum is diversified, extensive, and broad, yet, still, very course intensive.

The EEAP members believe that the curriculum objectives must continue to be evaluated to allow for faster and more flexible restructuring of existing courses.

The School was the first one established in Greece. It attracts students who make the School of PEM their first choice of studies. The programme graduates well-qualified engineers-managers who provide the ‘missing link’ in the modern marketplace. Graduates are readily and steadily employed within and outside Greece. Interviewed employers and external partners stated that ‘PEM-TUC graduates are preferred, and they are hired when they apply for a job’.
PART B: COMPLIANCE WITH THE PRINCIPLES

Principle 1: Academic Unit Policy for Quality Assurance

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 ALL INSTITUTION’S AREAS OF ACTIVITY, AND PARTICULARLY AT THE FULFILLMENT OF QUALITY REQUIREMENTS OF UNDERGRADUATE PROGRAMMES. THIS POLICY SHOULD BE PUBLISHED AND IMPLEMENTED BY ALL STAKEHOLDERS.

The quality assurance policy of the academic unit is in line with the Institutional policy on quality and is included in a published statement that is implemented by all stakeholders. It focuses on the achievement of special objectives related to the quality assurance of study programmes offered by the academic unit.

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 programme, its purpose and field of study; it will realize the programme’s strategic goals and it will determine the means and ways for attaining them; it will implement the appropriate quality procedures, aiming at the programme’s continuous improvement.

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

a) the suitability of the structure and organization of the curriculum;
b) the pursuit of learning outcomes and qualifications in accordance with the European and the National Qualifications Framework for Higher Education;
c) the promotion of the quality and effectiveness of teaching;
d) the appropriateness of the qualifications of the teaching staff;
e) the enhancement of the quality and quantity of the research output among faculty members of the academic unit;
f) ways for linking teaching and research;
g) the level of demand for qualifications acquired by graduates, in the labor market;
h) the quality of support services such as the administrative services, the Library, and the student welfare office;
i) the conduct of an annual review and an internal audit of the quality assurance system of the undergraduate programme(s) offered, as well as the collaboration of the Internal Evaluation Group (IEG) with the Institution’s Quality Assurance Unit (QAU).

Study Programme Compliance

Findings

The Quality Assurance Policy of the School of Production Engineering and Management has been prepared in collaboration with the Quality Assurance Unit (MODIP) of the Technical University of Crete, adopting and reflecting the University Quality Policies and strategic goals.

The mission of the School of PEM is the promotion of science and technology in the changing and complex techno-economic environment and the fulfilment of the needs of the industry, providing engineers equipped with the needed skills and abilities. The School, in its effort to fulfil its objectives, monitors the development in the environment and the marketplace adjusting the program curriculum to the needs of the economy.
The School's strategic goals are:

- The provision of high-level education, through a student-centred approach.
- Producing high-level research, also promoting linking teaching with research.
- The development of human resources to cover educational, research and operational needs of the School.
- The development of closed links with the local society, and the marketplace, and the establishment of partnerships with national and international scientific bodies and research institutions.

Analysis

The quality assurance procedures are subject to periodic evaluation, which is carried out by the Academic Program Committee and OMEA, in collaboration with MODIP of the Technical University of Crete. The final decisions are made by the General Assembly of the Department.

The Academic programme committee monitors the program delivery and develops proposals to the General Assembly related to the programme content and delivery process.

OMEA is responsible for monitoring and implementing the evaluation procedures of the School. For this purpose, OMEA collaborates with the MODIP of the Technical University of Crete. The OMEA presents the results of the above actions to the General Assembly of the School and suggests ways of improvement, ensuring the effective implementation of the School's quality policy.

The School's quality policy is available on the School's website. The quality policy and the corresponding actions and procedures implemented by the School, are presented to the newly admitted students in a special briefing meeting at the beginning of each academic year. The quality policy is presented at various informative events held by the school for the promotion of the undergraduate and postgraduate programs.

Conclusions

Based on the documentation provided, feedback from interviews of all the stakeholders, students, academic and administrative staff, employers and other social groups, the panel reached the conclusion that the School of PEM has a quality assurance policy that is in alignment with the institutional policy related to the overall quality. This policy is published on various venues accessible by all stakeholders.
Panel Judgment

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Panel Recommendations

The EEAP members recommend continuous monitoring and evaluation of quality assurance metrics.
Principle 2: Design and Approval of Programmes


Academic units develop their programmes following a well-defined procedure. The academic profile and orientation of the programme, the objectives, the subject areas, the structure and organization, the expected learning outcomes, and the intended professional qualifications according to the National Qualifications Framework for Higher Education are described at this stage. The approval or revision process for programmes includes a check of compliance with the basic requirements described in the Standards, on behalf of the Institution’s Quality Assurance Unit (QAU).

Furthermore, the programme design should take into consideration the following:

- the Institutional strategy
- the active participation of students
- the experience of external stakeholders from the labor market
- the smooth progression of students throughout the stages of the programme
- the anticipated student workload according to the European Credit Transfer and Accumulation System
- the option to provide work experience to the students
- the linking of teaching and research
- the relevant regulatory framework and the official procedure for the approval of the programme by the Institution

Study Programme Compliance

Findings

The School of Production Engineering and Management offers a 5-year Undergraduate Study Programme, which provides graduates with the opportunity to acquire specialized scientific knowledge, skills, and abilities, and at the same time, develop modern Engineering approaches that are required by the labour market.

The school has considered relevant programmes worldwide (Europe, United States, Asia, and Australia), as well as the output of discussions with students and all stakeholders before finalized the curriculum.

The diploma in Production Engineering and Management (PEM) is recognized as an Integrated Master’s degree and it is included in level 7 of the National and European Qualifications Framework. The duration of the study programme is at least ten (10) academic semesters with a load of 300 ECTS. The courses are divided into two categories: (a) compulsory courses and (b) optional compulsory courses. To graduate, students must accumulate a total of at least three hundred (300) ECTS. Students must successfully complete at least fifty-six (56) courses (45 are compulsory including 2 language courses, while 11 courses are electives). The eleven (11)
elective courses are chosen from a total of forty-one (41) courses offered by the School. The students also choose, undertake, prepare, and successfully support the Diploma Thesis, which corresponds to thirty (30) ECTS and it is a compulsory course included in the 45 courses. The programme gives students the opportunity to come in close contact with industry by undertaking the practical training module. Practical training is an elective course with 5 ECTS/month load. This load is not counted in the total ECTS number that are needed for graduation.

Analysis

The programme has well defined objectives, it is comprehensive and focused, with a sensible balance of fundamental and applied learning outcomes. The overall structure and content of the programme is like other established programs. There is a reasonable balance of core and elective courses, with appropriate depth and coverage of current and emerging themes.

The Student Guide provides complete and concise information on the programme structure, curriculum, and course content. The curriculum is well designed and compatible with universally accepted standards in the area. The design of the curriculum has been developed considering the University strategy and it is adapted to meet the needs of the Greek Industry/Economy. All course syllabi and the undergraduate course catalogue are rigorous and provide clear information on course structure and learning outcomes. The teaching staff set clear expectations on the courses and clarify the course assessment methods at the beginning of each academic term. The programme gives students the opportunity to come in close contact with the industry by undertaking the practical training module. The practical training is an elective course totalling 5 ECTS/month. This load is not counted in the total ECTS that are needed for graduation. Further on students are expected to undertake a mandatory research project totalling 30 ECTS.

The programme is compliant with the ECTS system. The students have opportunities to take courses abroad, thanks to the ERASMUS+ programme. Participation in Erasmus by students or teaching staff remains small.

For continuous improvement the programme benefits from informal feedback received from external stakeholders as well as from linking and integrating academic staff research activities in the curriculum. One important source of feedback for monitoring and improving quality is student questionnaires but the response rate is very low. The school has also developed an Advisory Board, members of which are graduates with managerial positions in the Industry.

During the discussions with students, the EEAP members saw that the students were satisfied by the overall atmosphere in the School and the help and guidance they receive from the faculty members. They have raised the issue of their involvement in the quality assurance process and the program review process.

The main areas of focus for future improvement should be the involvement of students in the Quality Assurance process and the formalization of feedback process with external stakeholders. Currently, the employers and local stakeholders’ feedback process is rather ad-hoc, based on personal contacts. The Department has already established an Advisory Board
but is not yet incorporated in the Quality Assurance procedures and the program development process of the department while its membership is restricted to program graduates.

**Conclusions**

The review, development and implementation of programme changes follows a clear process. The programme has clear and well-articulated goals that reflect modern discipline needs. This is complemented by some formal and informal feedback from students and external stakeholders. Future efforts should focus on improving the students’ involvement in the Quality Assurance process and formalizing the feedback process with external stakeholders.

**Panel Judgement**

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**The External Evaluation & Accreditation Panel agrees that this Programme leads to a Level 7 Qualification according to the National & European Qualifications Network (Integrated Master)**

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**Panel Recommendations**

The EEAP members recommend that:

- The School should consider enriching the membership of the Advisory Board with representatives of the stakeholders (permanent academic staff, Employers Federations, Industrialists, and alumni representatives).
- The School should consider ways of increasing the student response rate to the evaluation surveys.
- The School should examine the possibility of moving the Industrial training from elective courses to mandatory courses and increasing the load to 10 ECTS.
Principle 3: Student-centred Learning, Teaching and Assessment

INSTITUTIONS SHOULD ENSURE THAT THE UNDERGRADUATE PROGRAMMES ARE DELIVERED IN A WAY THAT ENCOURAGES STUDENTS TO TAKE AN ACTIVE ROLE IN CREATING THE LEARNING PROCESS. THE ASSESSMENT METHODS SHOULD REFLECT THIS APPROACH.

Student-centred learning and teaching plays an important role in stimulating students’ motivation, self-reflection, and engagement 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, enabling 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;
- reinforces 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 students’ complaints.

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;
- the regulations for assessment take into account mitigating circumstances;
- assessment is consistent, fairly applied to all students and carried out in accordance with the stated procedures;
- a formal procedure for student appeals is in place.

Study Programme Compliance

Findings

The School’s staff are fully committed to creating an environment wherein student-centred learning, teaching, and assessment can flourish. All classes (including both theoretical and laboratory ones) are delivered either through lectures (using both power point slides and blackboard examples), or online (as was the requirement during the pandemic). Some lectures also offer invited talks from industry or visiting academics. A significant portion of the classes include hands on practice (45% of the classes offer laboratory-based exercises, and more than 75% of the classes offer tutorials).

A newly established university-wide teaching and learning support department offers seminars to academics on how to improve their teaching skills, although participation is on a volunteering basis.
Analysis

The students are aware of grade components and assessment methods for each class as those are published in advance and are included in the study guide. In all classes it is foreseen that the first lecture is focused on explaining the intended learning outcomes, the syllabus, and the assessment scheme. All classes have unique webpage in the school’s virtual environment. All students are encouraged to develop soft skills, and seminars are organized that are funded by external secured funds from EU and regional sources. In certain classes, student projects are assigned to small groups of students. This encourages them to work together and helps them develop several soft skills which will help them succeed in their professional careers: teamwork, communication, leadership, presentation, are just a few examples of such skills.

The students are provided with the opportunity to evaluate and assess all their courses via electronically conducted course evaluation surveys near the end of each semester. Evidence was provided indicating the improvement in the performance over the last years (except for the students’ perception of the available resources). The percentage of students completing these surveys is low – between 15 and 20% of the enrolled students.

All students are assigned an academic advisor. The interviewed students indicated that appeals/complaints are almost invariably considered and/or resolved within the school. The appeals process is clearly defined in the paperwork submitted.

Conclusions

In conclusion, the panel has determined that the new undergraduate program is student-centred, cultivates and promotes mutual respect between the students, the faculty, and the administrative staff. Students believe that they have sufficient freedom to plan their academic path and express their appreciation for the support they receive from the faculty, the Chair of the Department, and from the administrative staff. Certain small continuous improvement adjustments can be easily applied and are to be expected in new academic programs.

The Panel finds that this new undergraduate programme is in full compliance.

Panel Judgement

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Panel Recommendations.

The EEAP members recommend that:

- Teaching staff should engage further with local and national industry, establish partnerships, and seek practical training opportunities for current students.
- Further enhance the practical hands-on experience for the students. Internships should become mandatory for the students, and count for the required ECTS for completing their studies.
Principle 4: Student Admission, Progression, Recognition and Certification

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

Institutions and academic units need to put in place both processes and tools to collect, manage and act on information regarding student progression.

Procedures concerning the award and recognition of higher education degrees, the duration of studies, rules ensuring students progression, terms and conditions for student mobility should be based on the institutional study regulations. Appropriate recognition procedures rely on institutional practice for recognition of credits among various European academic departments and Institutions, in line with the principles of the Lisbon Recognition Convention.

Graduation represents the culmination of the students' study period. Students need to receive documentation explaining the qualification gained, including achieved learning outcomes and the context, level, content and status of the studies that were pursued and successfully completed (Diploma Supplement).

Study Programme Compliance

Findings

The Undergraduate Studies Guide, available on the School's website, provides comprehensive information about the procedures, rights, and obligations of students throughout their academic journey.

First-year students are provided with orientation events and resources to help them transition smoothly into university life. These include welcome events, information about the city and student life, and guidance on academic and career matters.

The School organizes the "Management and Production Consulting Day" where graduates share their experiences and provide advice to students. This event strengthens the ties between the faculty, alumni, and new students.

The progress of students is monitored through an electronic information system where teachers enter scores. Study duration indicators and academic performance data are collected and analysed to identify areas for improvement.

Scholarships are available for students and graduates, including awards for best theses, excellence, and honourable mentions. Information about scholarships is automatically forwarded to students, ensuring they are aware of these opportunities.

Student mobility is supported through offices and committees dedicated to the ERASMUS+ exchange program and internships. Selection criteria and procedures for study-related mobility are clearly defined and communicated to students.
The European System for Transfer and Accumulation of Credit Units (ECTS) is followed, with a total of 300 ECTS required to obtain a diploma. Each semester corresponds to 30 ECTS, and the curriculum provides flexibility in course selection.

A Diploma Supplement is attached to the diploma to enhance the graduates' understanding and recognition of their qualifications.

The preparation of a diploma thesis is mandatory, and evaluation criteria include content quality, text quality, and oral presentation. Thesis topics are announced at the beginning of each academic year, and students can collaborate with faculty members on research projects.

Practical exercises, such as internships, are offered to students to gain real-world experience and connect with potential employers. The internship program is supervised by a committee and has shown positive outcomes in terms of students' employment prospects.

**Analysis**

Based on the above findings, the following are summarized:

The School has implemented various initiatives and resources to support first-year students, ensuring a smooth transition into university life. These efforts contribute to students' overall experience and engagement.

The monitoring of student progress and academic performance allows for timely interventions and support when needed. The data collected enables the identification of areas where students may require additional assistance.

The availability of scholarships and recognition awards motivates students to excel academically and provides financial support to those in need. The automatic forwarding of scholarship information ensures students are well-informed about available opportunities.

The clear guidelines and procedures for student mobility, including study-related exchanges and internships, promote internationalization and provide valuable learning experiences. The use of the ECTS system facilitates credit transfer and recognition between institutions.

The mandatory diploma thesis requirement and the emphasis on research and practical exercises contribute to the development of students' research and problem-solving skills. Collaboration with faculty members and participation in research projects enhance students' academic and professional growth.

**Conclusions**

The Panel finds that the undergraduate programme is in full compliance with Principle 4.
### Panel Judgement

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### Panel Recommendations

The EEAP members recommend that:

- The School strengthens feedback mechanisms: Implement regular surveys or focus groups to gather feedback from students, faculty, and employers on the effectiveness of current practices and identify areas for improvement. Utilize this feedback to inform decision-making and enhance the overall student experience.

- The School enhances alumni engagement: Develop initiatives to engage alumni actively in supporting current students, such as mentorship programs, guest lectures, and career networking events. Alumni can share their industry insights and experiences, providing valuable guidance and opportunities for students.
Principle 5: Teaching Staff


The Institutions and their academic units have a major responsibility as to the standard of their teaching staff providing them with a supportive environment that promotes the advancement of their scientific work. In particular, the academic unit should:

- set up and follow clear, transparent and fair processes for the recruitment of properly qualified staff 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 members (with respect to attendance requirements, performance, self-assessment, training etc.);
- develop policies to attract highly qualified academic staff.

Study Programme Compliance

Findings

Staffing: The teaching staff of the undergraduate program consists of various categories, including members of the Faculty and EDIP of the School, faculty members from other schools within the Technical University of Crete, EEP members, and fixed-term contract teachers. Faculty members from other schools contribute to teaching courses that require specialized knowledge not covered by the faculty members of the Faculty of Law. EEP members handle the instruction of foreign language courses, while contract teachers are periodically hired to meet specific teaching needs. Additionally, the institution has implemented the role of academic managers, assigning faculty members as responsible for each course, ensuring quality teaching, and supporting the organization of materials and related teaching processes.

Selection and Development Procedures: The MPD School follows clear, meritorious, and transparent procedures for the selection and development of faculty members. These procedures respect the importance of teaching and research, adhering to existing legislation and utilizing the APELLA platform supervised by the Ministry of Education. The selection process involves several stages, such as announcing a position, establishing an electoral body, forming an advisory committee, and submitting reports. The evaluation of candidates focuses not only on their research projects but also on their teaching abilities. Trial courses/lectures are conducted to assess candidates' teaching skills, and existing evaluation reports on teaching work are considered during the development procedures. The School ensures transparency and meritocracy throughout the selection and development processes.

Teaching Duties and Workload: The minimum teaching load of the faculty members is determined by legislation, and the allocation of teaching work is decided by the Department Assembly. At the beginning of each academic year, faculty members submit a Faculty Activities
Planning form, which includes their suggested teaching tasks, such as self-teaching courses, teaching other courses, and thesis supervision. The form also accounts for other responsibilities like research, administrative work, and presence on the university premises. Teaching foreign language courses for ERASMUS+ students is considered part of the faculty members’ teaching load, encouraging mobility actions. The average teaching load per week is currently reported as 11.4 hours, encompassing various teaching responsibilities.

Analysis

The staffing of the undergraduate programme shows a diverse range of teaching staff categories, ensuring expertise and coverage of specialized subjects. The presence of academic managers further supports the quality and organization of teaching. The selection and development procedures followed by the MPD School demonstrate a commitment to transparency and meritocracy, ensuring that faculty members are chosen based on qualifications and skills. The evaluation of teaching work and the emphasis on teaching ability contribute to the continuous improvement of instruction. The workload allocation process provides flexibility while considering faculty members' teaching, research, and administrative responsibilities.

Conclusions

The findings highlight the satisfactory implementation of the 5th principle, ensuring the qualifications and competence of the teaching staff through transparent recruitment and development processes. The PEM School demonstrates a commitment to quality education by assigning academic managers, evaluating teaching abilities, and considering student feedback.

Panel Judgement

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Panel Recommendations

The EEAP members have the following recommendations.

Student Feedback and Engagement: While the current evaluation system collects student feedback through questionnaires, it is recommended to encourage more active student engagement in the evaluation process. In addition to questionnaires, open forums or focus group discussions can be organized to obtain qualitative feedback from students. Faculty members can also be encouraged to seek feedback from students during the semester to address any concerns and make timely improvements to their teaching methodologies.
Principle 6: Learning Resources and Student Support

INSTITUTIONS SHOULD HAVE ADEQUATE FUNDING TO COVER TEACHING AND LEARNING NEEDS. 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, BOARDING, CAREER AND SOCIAL POLICY SERVICES ETC.).

Institutions and their academic units must have sufficient funding and means to support learning and academic activity in general, so that they can offer to students the best possible level of studies. The above means could include facilities such as libraries, study rooms, educational and scientific equipment, information and communications services, support or 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 or international students, students with disabilities) and 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 ensures that all resources are appropriate, adequate, and accessible, and that students are informed about the services available to them.

In delivering support services the role of support and administrative staff is crucial and therefore they need to be qualified and have opportunities to develop their competences.

Study Programme Compliance

Findings

The School has 26 academic members of staff. Additionally, the school is supported by 18 teaching members of staff, 3 technicians, 2 administrators and 3 secretariats.

The School has been allocated very good facilities (5 auditoriums and 6 lecture rooms) on a campus close to the city centre of Chania, which allows it to adequately support its academic mission. The school offices are spread into three buildings. Available IT support also appears to be adequate. Most areas are accessible by students with disabilities. It appears that overall, the facilities are distributed rationally.

In total, the School has 16 labs, 13 being solely used by the School and 3 that are shared with other schools.

There are several support services available to the students and they are all listed on the School’s web site. All entering students are assigned an academic advisor and are made aware of an existing formal process for student appeals and complaints, along with a considerable amount of general useful information about the university, buildings, facilities, and the local area. Some career counselling is provided by the academic advisor. All entering students are assigned an advisor during their first semester on campus. Students are also informed about all available services during their first semester.

Analysis

Overall, there are adequate facilities to carry out the academic mission. The only challenge, in terms of the size of the lecture rooms, is associated with accommodating the exams. This is addressed by the School with using large number of invigilators. Due to the large number of
students enrolled every year (a decision made centrally by the ministry of education and not controlled by the university and the school), the laboratory exercises must be repeated multiple times, as to maintain a healthy number of students attending at any given time the labs.

There is a need for additional administrative staff, especially to deal with the large student body size. Also, the students interviewed were satisfied.

There is a need for additional technical support staff for the laboratories, and adequate resources for the needed maintenance and periodic modernization/update of laboratory equipment, laptop computers, and the like.

Conclusions

The panel finds that the School has been provided with sufficient and well-equipped facilities and laboratories, to ensure a high-quality teaching and learning environment for the new undergraduate program. The Panel finds that the school follows the principle.

Panel Judgment

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Panel Recommendations

The EEAP members recommend that:

- The School secures resources for required maintenance of facilities and laboratories.
- The School secures resources for appointing more technicians to be involved in laboratories.
- Funds must be secured for training and development of skills for both technicians and teaching staff. A clear development plan should be established for promoting teaching staff into academics.
Principle 7: Information Management

INSTITUTIONS BEAR FULL RESPONSIBILITY FOR COLLECTING, ANALYSING AND USING INFORMATION, AIMED AT THE EFFICIENT MANAGEMENT OF UNDERGRADUATE PROGRAMMES OF STUDY 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 organization, teaching and provision of services to students as well as to the academic community.

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

The information gathered 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 programme(s)
- availability of learning resources and student support
- career paths of graduates

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

Study Programme Compliance

Findings

MODIP collects data from students, graduates, professors, employees for the performance indicators relative to teaching, research, and other academic activities in a way that the quality goals are reflected in the IQAS procedures.

Analysis of judgement

Even though significant efforts have been made in the School to facilitate the evaluation process (e.g., electronic questionnaires, HAHE Quality Data Management System), the participation of students in the evaluation of courses and professors remains in low levels. As a result, there is no effective exploitation of the results in the sense of a systematic monitoring that will include most students and will provide feedback every semester to the teachers, upon completion of their courses, but also the School itself, for immediate corrective actions regarding the study programmes. Although the School organizes events on a regular basis there should be a strengthening of the role of graduates and colleagues of the school. The establishment of a communication channel including PEM students, graduates, National Management & Industrial Engineering Association of Greece, and Technical Chamber of Greece should be a must.
Conclusions

Based on the documentation provided, the PEM School operates a Quality Data Management System for the management and monitoring of data and runs procedures for collecting and analyzing information on study programmes and other activities feed data into the internal system of quality assurance.

Panel Judgement

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Panel Recommendations

The EEAP members recommend to:

- Improve the process of student evaluation.
- Improve the collaboration with National Management & Industrial Engineering Association of Greece and Technical Chamber of Greece.
Principle 8: Public Information

INSTITUTIONS SHOULD PUBLISH INFORMATION ABOUT THEIR TEACHING AND ACADEMIC ACTIVITIES WHICH IS CLEAR, ACCURATE, OBJECTIVE, UP-TO-DATE AND READILY ACCESSIBLE.

Information on Institution’s activities is useful for prospective and current students, graduates, other stakeholders and the public.

Therefore, institutions and their academic units provide information about their activities, including the programmes they offer, the intended learning outcomes, the qualifications awarded, the teaching, learning and assessment procedures used, the pass rates and the learning opportunities available to their students, as well as graduate employment information.

Study Programme Compliance

Findings

The PEM School has a full of content but old website, yet with a design that makes it difficult to navigate through mobile devices. It has both Greek and English versions but there is disparity between the two regarding the information that is displayed in each one. The website includes information on School’s history, goals, organization, administrative organizational structure, quality policy, external evaluation, honorary doctors, awards & distinctions, academic departmental personnel and functions, information on undergraduate, graduate, doctoral & postdoctoral studies, scientific laboratories and research, facilities infrastructure, support services and facilities especially for students, activities, as well as up to date announcements about news, seminars awards, distinctions, publications, and noteworthy accomplishments of the School and events.

Analysis

Although the PEM website presents the institutional Quality Policy, its objectives, the internal evaluation reports (only in the Greek version) and the external evaluation reports, such information must be accessed more easily through the main menu of the site with a separate section about Quality Policy. The TUC MODIP site also must be referenced in the PEM site.

Conclusions

The Panel found that the school provides information about their activities, including the programmes they offer, the intended learning outcomes, the qualifications awarded, the teaching, learning, the pass rates, and the learning opportunities available to the public.
Panel Judgment

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Panel Recommendations

The EEAP members recommend to:

- Upgrade the website CMS to a modern one with optimized mobile UI/UX.
- Improve the correspondence of material content between the Greek and English language versions of the website.
- Extend the main site menu with the section of Quality Policy.
- Optimize the social media presence improving the correspondence of content between the site and the social media.
Principle 9: On-going Monitoring and Periodic Internal Review of Programmes

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

Regular monitoring, review and revision of study programmes aim to maintain the level of educational provision and to create a supportive and effective learning environment for students.

The above comprise the evaluation of:

- the content of the programme in the light of the latest research in the given discipline, thus ensuring that the programme is up to date;
- the changing needs of society;
- the students’ workload, progression and completion;
- the effectiveness of the procedures for the assessment of students;
- the students’ expectations, needs and satisfaction in relation to the programme;
- the learning environment, support services and their fitness for purpose for the programme

Programmes are reviewed and revised regularly involving students and other stakeholders. The information collected is analyzed and the programme is adapted to ensure that it is up-to-date. Revised programme specifications are published.

Study Programme Compliance

Findings

The QA system of the University addresses this principle thoroughly.

There is a data collection infrastructure for analysis of quantitative metrics along with qualitative assessment based on student and staff surveys. This collection of quality indicators includes data on enrolment, grades, course, exam attempts, teaching load, faculty performance metrics, and other statistics. It is reported annually in a report for review and analysis by the administration.

The faculty are actively in contact with many external industrial and academic groups and have a high level of interaction through which to obtain this feedback. Employers are generally very satisfied with the preparation of the students and feel that the program provides an exceptionally strong foundational preparation for industrial practice. The committee’s interviews with employers confirmed this high level of interaction and alignment of the program with their needs.

Changes to courses and the program are evaluated and proposed through a formal process and are approved through the Committee for Undergraduate Studies. Faculty can propose new courses, curricular changes, and the elimination or combination of courses through this mechanism.

Student workload is monitored primarily through course surveys and student self-reports in course evaluations.

Student assessment in courses is well structured. The School has adopted a student-centred learning and teaching practice. Grades are based on a diversity of metrics taken along the
progress of the course offering and are usually not exclusively determined by the final exam. Several example rubrics used in courses were provided to further elaborate this approach.

Student expectations, needs, and workload are collected both informally and through surveys that are distributed as part of each course. One challenge is the low response rate for course surveys. Students are aware of these end-of-course surveys, but they are not heavily involved in the evaluation process.

Analysis

The School has developed and implemented a comprehensive process to monitor and evaluate its programme, maintaining and improving quality.

Conclusions

The EEAP members are satisfied with the continuous monitoring and internal review and evaluation procedures of the programme. They are impressed with the fact that the School has completed five consecutive evaluations, the last one during the 2019-2020 Academic Year.

Panel Judgment

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Panel Recommendations

Logged student responses to course surveys should be improved. This is a challenge both for evaluating faculty as well as providing feedback on courses. One possible challenge may be that formal surveys are offered during a specific period/time frame, which may be unsuitable to either improve a course or modify the course. However, if, or when, faculty offer mid-term surveys, this may be beneficial. That is, offering a mid-term logged assessment could help improve student response and memorialize this feedback, as students will be the direct beneficiaries of this process.

The support and administrative staff and the interaction with faculty was universally commended by the students.

Creating a formal alumni organization / office will be of benefit to the School. It will help establish engagement with the alumni network and could strengthen many of the student interactions, providing avenues for more employment opportunities.

The School should consider convening a formal industrial advisory board to offer more regular/structured feedback on the program. Several of the alumni and industrial partners interviewed as part of this exercise expressed interest in further engagement of this type.
Principle 10: Regular External Evaluation of Undergraduate Programmes

Programmes should regularly undergo evaluation by committees 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 programme accreditation process which is realised as an external evaluation procedure, and implemented by a committee of independent experts. HAHE grants accreditation of programmes, with a specific term of validity, following to which revision is required. The accreditation of the quality of the programmes acts as a means of verification of the compliance of the programme with the template’s requirements, and as a catalyst for improvement, while opening new perspectives towards the international standing of the awarded degrees.

Both academic units and institutions participate in the regular external quality assurance process, while respecting the requirements of the legislative framework in which they operate.

The quality assurance, in this case the accreditation, is an on-going process that does not end with the external feedback, or report or its follow-up process within the Institution. Therefore, Institutions and their academic units ensure that the progress made since the last external quality assurance activity is taken into consideration when preparing for the next one.

Study Programme Compliance

The School went through external evaluation in 2012. The findings of the evaluation committee at that time led to a program restructuring and five internal evaluations during the period 2015-2020. The School has provided evidence of programmatic, curriculum and administrative changes that overall demonstrate remarkable progress.

Faculty, support staff and administrative personnel are aware of the importance of the external evaluation, and they have complied with the whole process. All involved parties are helpful and willing to help.

There is evidence that external stakeholders and employers interact with faculty and students. However, there is no industrial advisory board (IAB) or established formal interaction to make this correspondence more efficient.

Panel Judgment

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Panel Recommendations

The EEAP members recommend that the external evaluation process must be a regularly recurring event, once every five or six years, with a strict requirement to address and start implementing recommendations within one year.
PART C: CONCLUSIONS

I. Features of Good Practice

The School of Production Engineering and Management has gone through an outstanding ‘transformation’ since the 2012 evaluation, as evidenced by the five consecutive internal evaluations during the 2015-2020 period. The current five-year curriculum is updated, it is well-balanced, and the number of total required courses has been reduced to 56 from 61. Practical training is part of the curriculum, although not mandatory. Practical Training is a strength of the program, but it should be, somehow, enforced and be better implemented to accommodate more students.

The program graduates well-qualified engineers and managers who are readily and steadily employed. Interviewed employers and external partners stated that PEM-TUC graduates are offered a job when they interview.

The School has put in place a functional electronic system for all courses and other informational items that are required to complete the curriculum.

The School has an informative and user-friendly web presence with detailed information on academic activities, student support services, the curriculum, the faculty and their research, and its quality assurance policy, targets, and metrics. The School’s web presence is comprehensive and functional.

The School has developed and implemented a self-evaluation process for quality assurance that includes a comprehensive set of QIs. MODIP receives and analyses data to continuously improve programmes and deliverables.

The University and School have established the Office of Teaching and Learning (an outstanding idea), which offers support to all members and a plethora of workshops to improve teaching metaphors and to better stimulate student engagement in class.

There are several course delivery methods spanning traditional /conventional, electronic, and multimedia tools and support technologies. The EEAP members recommend continuous evaluation for improvement, along with creating smart and flipped classrooms with the ability for online use of course support technologies.

Compared to 2012, there is an excellent and healthy interaction among faculty, faculty-staff and among faculty-staff-students. There is a healthy interaction with external stakeholders and the local society as also evidenced by several funded projects. Students, overall, speak highly of their instructors who are available and helpful.

In summary, there is no comparison between 2012 and 2023. The School has achieved excellence despite recurring and ongoing systemic challenges – the objective now is to sustain such excellence.

II. Areas of Weakness

It is stated that most concerns are basically due to ‘systemic’ problems, the origin of which is outside the University. Such weaknesses, long-term, may negatively impact the School, thus, they need to be rectified. The Ministry of Education and Religion must seriously consider the
University’s needs and strategic plan and provide the much-needed resources for successful implementation. Such weaknesses are:

a. Lack of substantial, annual, funding from the State to cover and support all educational needs.
b. Lack of sufficient faculty members and support staff to cover all School needs.
c. High number of incoming students every year. The School’s recommendations are completely ignored!
d. Secure funding for Practical Training opportunities, to accommodate a larger number of students.

An additional recommendation relates to establishing an aggressive alumni organization to better promote the School, to create lasting partnerships and to better connect the School with the marketplace, industry, and the private sector.

III. Recommendations for Follow-up Actions
Overall, the EEAP members are pleased with the School’s efforts and activities to improve, balance, and modernize the curriculum. The committee is impressed with the maturity and quality of the students who met with the committee. The School attracts students who have made this option their first choice. The reputation of the graduates, the quality and productivity of the faculty and staff and the professional and friendly environment are great assets of the School.

Faculty and staff are underpaid. Resources need to improve. Lack of funding and State-imposed regulations and restrictions negatively impact progress and advancement.

The committee believes that the University as a whole and the School must be autonomous and independent to set up and follow their strategic plan(s). The State must be an enforcer, not an obstacle.

It is a must to form an (active and aggressive) Industrial Advisory Board (IAB) to increase and improve interaction and feedback between the School, marketplace, and all external stakeholders.

The committee recommends a formal and continuously updated mechanism to track the School’s graduates and their professional advancement. Former graduates should be given a chance to be involved with the School, in various capacities – including curriculum development, stewardship, and even sponsorship of various student-centric activities.

Another idea worth considering is to create a forum to showcase faculty and student accomplishments, activities, and awards. This will improve external visibility, allow for better and more interactions, increase student and faculty mobility, and further strengthen the School’s reputation.
IV. Summary & Overall Assessment

The Principles where full compliance has been achieved are: 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10.

The Principles where substantial compliance has been achieved are: None.

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

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

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The External Evaluation & Accreditation Panel agrees that this Programme leads to a Level 7 Qualification according to the National & European Qualifications Network (Integrated Master)
The members of the External Evaluation & Accreditation Panel

Name and Surname

1. **Prof. Kimon P. Valavanis** (Chair)
   University of Denver, USA

2. **Prof. Konstantinos Salonitis**
   Cranfield University, United Kingdom

3. **Prof. Andreas Efstathiades**
   European University Cyprus, Cyprus

4. **Mr. Pavlos Kalenderoglou**
   Representative, Technical Chamber of Greece

5. **Mr. Sarantis Antoniou, Student**
   Democritus University of Thrace