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HELLENIC REPUBLIC

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

Mechanical Engineering
Institution: National Technical University of Athens
Date: 13 March 2021

Ευρωπαϊκή Ένωση
Ευρωπαϊκό Κοινωνικό Ταμείο
Επιχειρησιακό Πρόγραμμα
Ανάπτυξη Ανθρώπινου Δυναμικού, Εκπαίδευση και Διά Βίου Μάθηση
Με τη συγχρηματοδότηση της Ελλάδας και της Ευρωπαϊκής Ένωσης
ΕΣΠΑ 2014-2020
enqa.

Report of the Panel appointed by the HAHE to undertake the review of the Undergraduate Study Programme (Integrated Master) of **Mechanical Engineering** of the **National Technical University of Athens** 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 Undergraduate Study Programme (Integrated Master) of **Mechanical Engineering** of the **National Technical University of Athens** comprised the following five (5) members, drawn from the HAHE Register, in accordance with Laws 4009/2011 & 4653/2020:

1. **Professor Konstantinos Salonitis (Chair)**
   Cranfield University, United Kingdom

2. **Professor John Botsis**
   École Polytechnique Fédérale de Lausanne (EPFL), Switzerland

3. **Professor Emeritus George Haritos**
   The University of Akron, Ohio, United States of America

4. **Professor Miltiadis Papalexandris**
   Université catholique de Louvain, Belgium

5. **Mr Panagiotis Kiskiras**
   Member of the Technical Chamber of Greece, Greece

II. Review Procedure and Documentation

The External Evaluation & Accreditation review of the **Mechanical Engineering** Undergraduate Programme (MM UP) of the **National Technical University of Athens** was undertaken on March 08 through March 13, 2021. The review was virtual via the ZOOM platform due to the pandemic travel restrictions. The members of the External Evaluation and Accreditation Panel (EEAP) were Prof. Konstantinos Salonitis (chair), Prof. John Botsis, Prof. Emeritus George Haritos, Prof. Miltiadis Papalexandris and Mr. Panagiotis Kiskiras.

The EEAP received a number of documents from both the University and the Hellenic Authority for Higher Education (HAHE) in advance. The following documents were reviewed by the Panel prior to the first meeting:

B1. Πρόταση Ακαδημαϊκής Πιστοποίησης ΠΠΣ
B2. Πολιτική Ποιότητας ΠΠΣ
B3. Οδηγός Σπουδών
B4. Κανονισμός ΠΠΣ και λοιποί κανονισμοί
- *B4i. Πρακτική Άσκηση Οδηγίες*
- *B4ii. Εσωτερικός κανονισμός λειτουργίας ΕΜΠ*
- *B4iii. Κανονισμός Λειτουργίας ΠΠΣ ΣΜΜ ΕΜΠ*

B5. Περιγράμματα μαθημάτων
B6. Στοχοθεσία Ποιότητας ΠΠΣ
B7. Υποδείγματα ερωτηματολογίων φοιτητών και αποτελέσματα επεξεργασίας τους
- *B7i. Πρότυπο Ερωτηματολόγιο Μαθήματος ΜΟΔΙΠ ΕΜΠ*
- *B7ii. Επεξεργασία ερωτηματολογίων*
- *B7iii. Συγκεντρωτικά αποτελέσματα χειμ. εξαμήνου 2017-2018*

B8. Αποτελέσματα εσωτερικής αξιολόγησης του ΠΠΣ από τη ΜΟΔΙΠ
B9. Αναφορές δεδομένων από το Ολοκληρωμένο Πληροφοριακό Εθνικό Σύστημα Ποιότητας για τα ακαδ. έτη 2015-2016, 2016-2017, 2017-2018, 2018-2019 και ημερ. έτη 2016, 2017, 2018, 2019
- *B9i. Σχολή ΜΜ - Τμήμα 2016*
- *B9ii. Σχολή ΜΜ - Τμήμα 2017*
- *B9iii. Σχολή ΜΜ - Τμήμα 2018*
- *B9iv. Σχολή ΜΜ - Τμήμα 2019*
- *B9v. Σχολή ΜΜ - ΠΠΣ 2016*
- *B9vi. Σχολή ΜΜ - ΠΠΣ 2017*
- *B9vii. Σχολή ΜΜ - ΠΠΣ 2018*
- *B9viii. Σχολή ΜΜ - ΠΠΣ 2019*

B10. Λοιπό υλικό τεκμηρίωσης B10i. Στρατηγική ΣΜΜ ΕΜΠ
- *B10ii. Εισηγητική έκθεση επιτροπής στρατηγικής*
- *B10iii. Παράρτημα Διπλώματος*
- *B10iv. Κανονισμός ΒΚΦΕ*
- *B10v. Απογραφικό Δελτίο Μαθήματος - Μέλη ΔΕΠ*
- *B10vi. ΕΕσΑ 2015-2018 υπό συζήτηση*
- *B10vii. ΕΕσΑ 2012-2015*
- *B10viii. ΦΕΚ Επαγγελματικά δικαιώματα*
- *B10ix. ΦΕΚ ΕΠΠ Integrated Master*

B11. Πρόσθετοι όροι

B11i. Παράρτημα, πρόσθετοι οροί
B11ii. Απόφαση Σχολής και Συγκλήτου
B11iii. Κανονισμός Εκπόνησης Διπλωματικής Εργασίας
B11iv. Ενιαίος Συνδυαστικός Πίνακας Μαθήματων Εμβάθυνσης/Ειδικότητας

March 01, 2021: Orientation Meeting

On Monday, March 01, a virtual ZOOM orientation meeting took place. The director general of HAHE, Dr. Besta, presented the HAHE objectives for the accreditation and discussed the accreditation process.

March 08, 2021: EEAP Private Meeting

The Panel met virtually to briefly discuss the documents included in the proposal folder and allocate tasks.

March 09, 2021: Teleconference with Vice-Rector/President of MODIP & Head of the School

On Tuesday March 09, the EEAP had a video teleconference with the NTUA Vice rector Prof. D. Gintides (who is also the president of the Quality Assurance Unit) and the Head of Mechanical Engineering school Prof. N. Marmaras. In the meeting, an overview of the programme was presented by Prof. N. Marmaras, including the history, academic profile, current status, strengths, and possible areas of concern.

March 09, 2021: Teleconference with OMEA & MODIP representatives

A teleconference with the school's Quality assurance team (OMEA) and the university's Quality Assurance Unit (MODIP) took place. Present were the representatives from MODIP team: Prof. D. Mamais and Prof. K. Nikita and the OMEA team: Prof. K. Mathioudakis (co-ordinator), Assoc. Prof. M. Anagnostakis, Prof. M. Founti, Prof. K. Kyriakopoulos, Assoc. Prof. S. Ponis. In the meeting the degree of compliance of the programme to the Quality Standards for Accreditation was discussed. Prof. K. Mathioudakis presented the department's view and preparation for the accreditation.

March 09, 2021: Teleconference with teaching staff members

After a short break, the EEAP met with teaching staff from the school. In the meeting, Assoc. Prof. D. Bouris, Prof. S. Karelas, Prof. E. Papadopoulos, Assist. Prof. A. Rentizelas, Prof. S. Voutsinas, and Assoc. Prof. E. Koronaki were present. The EEAP had the opportunity to discuss with the teaching staff: professional development opportunities, mobility, workload, student evaluations; competence and adequacy of the teaching staff to ensure learning outcomes; link between teaching and research; teaching staff's involvement in applied research, projects and research activities directly related to the programme; possible areas of weakness.

March 09, 2021: Teleconference with students

A teleconference with the students took place. Six (6) students in various phases of their studies attended the meeting. The objective of the meeting was to discuss the students' study experiences at the university. The students were in general pleased with theirs studies and forthcoming with their experiences. They were very enthusiastic with the high quality of education they receive and the relationships with the academic staff. They highlighted areas of concern such as the student workload.

March 09, 2021: EEAP Debriefing

At the end of the meeting with the students, the EEAP had a debriefing meeting, discussed the initial impressions from the first day of virtual discussions and set the priorities for the following day.

March 10, 2021: EEAP Pre-briefing for second day "visits"

On Wednesday 10 March, the EEAP met briefly to discuss the strategy for the day and summarize the impressions from the previous day.

March 10, 2021: On-line tour: classrooms, lecture halls, libraries laboratories, and other facilities/Discussion about the facilities presented in the video produced for this purpose

The first meeting for the day was with administrative staff members and teaching staff members. The OMEA and MODIP provided pre-recorded videos of the facilities. In the teleconference, Ms D. Dardamani (Head of the Secretariat), Prof. I. Antoniadis, Prof. D. Hountalas, Mr D. Kolaitis (EDIP), Assoc. Prof. N. Petropoulos, Assoc. Prof. A. Markopoulos, Prof. D. Mathioulakis, and Prof. G. Vosniakos, were present. The EEAP had the chance to evaluate facilities and learning resources to ascertain that the learning materials, equipment and facilities are adequate for a successful provision of the programme. The discussion focused on the status of the facilities, the financial challenges for updating and renovating equipment, and the issues of security on campus.

March 10, 2021: Teleconference with Programme graduates

The following meeting was with graduates to discuss their experience of studying at the school and their career path. The alumni were all extremely enthusiastic with the high quality of education they received and the impact on their professional careers. The following were present: Dr Dionysios Chionis (AXPO POWER AG, Switzerland), Ms Maria Katsourou (Rolls-Royce Plc, United Kingdom), Dr Christos Keramiotis (Director, Strategy & Business Development, DEI Ananeosimes S.A.), Dr Ioannis Mandilaras (EYDAP SA, Executive Division of Sewerage Water), Prof. Spyros Masouros (Reader, Imperial College, United Kingdom), Mr Kostas D. Papadodimas (MINERVA MARINE Inc, Technical Manager – New Buildings, Projects & Reliability), Ms Pantelia Anna (Liana) Papanikolaou (Consultant at Deloitte), Dr Athanasios Spanos (Director, PWC) and Ms Nikoletta Thoma (Senior Underwriter at Helvetia Insurance, Switzerland).

March 10, 2021: Teleconference with employers, social partners

A teleconference with the external stakeholders from the private and public sector took place. The discussion was very informative, and all present were positively impressed with the contributions of the graduates as well as the department staff themselves. The following external stakeholders were present: Mr Theodoros Fessas (CEO INFO-QUEST, Former Chairman, Hellenic federation of Enterprises), Dr Fotis Karagiannis (Director General for Thermal and Hydraulic Power Generation, PPC S.A.), Mr Christos Pantzikas (Director General for Engineering & Commissioning, METKA), Dr Iordanis Paradisiadis (Vice President, EnergyOne S.A.), Dr George Vourliotakis (Energy Policy and Planning Manager, EXERGIA S.A.) and Mr George Kafiris, (ELECTROMEC S.A.).

March 10, 2021: EEAP debriefing

The panel then assembled and discussed the key findings as well as highlighted any points that needed to be clarified.

March 10, 2021: Teleconference with OMEA & MODIP representatives

The EEAP met with the OMEA team and the MODIP representatives. In a short meeting the EEAP had the chance to clarify questions and concerns.

March 10, 2021: Closure with the Vice-Rector/President of MODIP, the Head of the School, OMEA & MODIP

The EEAP met for the final meeting of the day with the vice rector and the head of the school, as well as the OMEA team and the MODIP representatives. The Chair of the EEAP had the chance to present informally the EEAP key findings. The EEAP members were positively impressed with the high professionalism and high quality of the presentations made by all the MODIP and faculty members. The presentations were critical in appreciating the high quality of education provided by the department.

March 11 - 14, 2021: Accreditation Report drafting and submission

The EEAP met for discussing the findings, draft the accreditation report, approve in a consensus the content of the report and submit to HAHE.

III. Study Programme Profile

NTUA was founded in 1837 and is the oldest Technical University in Greece. Initially established by a royal decree "on architectural education" it was a technical school operating on Sundays and holidays. By spring 1840 the technical school extended operation to a regular day school along with the Sundays' counterpart. The first-degree course in Mechanical Engineering was offered in 1887. The school of Mechanical & Electrical Engineering was established in 1917. In 1975, the school of Mechanical and Electrical Engineering was divided into two independent schools. The school of Mechanical Engineering included the divisions of Production Engineering and Naval Engineering. The division of Naval Engineering was separated from the department of Mechanical Engineering in 1983, forming an independent department.

The school of Mechanical Engineering is structured into six (6) sections:

- Industrial Management and Operational Research,
- Thermal Engineering,
- Mechanical Design and Automatic Control,
- Nuclear Engineering,
- Fluids,
- Manufacturing Technology.

At its current state, the school employees 42 academics (21 full Professors, 12 Associate Professors, 8 Assistant Professors and 1 Lecturer). It also employs 35 teaching staff and 21 technical staff. It is supported by a total of 19 secretariat and support staff. NTUA runs two campus in Athens, the Zografou Campus and the Patission Complex. The school of Mechanical Engineering is located at the Zografou Campus.

The undergraduate programme in Mechanical Engineers leads to an integrated master's degree after collecting 300 ECTS in a minimum of five years study. It offers four different study tracks, although all students follow the same syllabus and curriculum for the first 6 semesters. The four different study tracks are:

- Energy engineering,
- Mechanical Design,
- Industrial Engineering,
- Air and Ground Transport Vehicles.

The enrolment to the school takes place every September, and in total approximately 240 students enrol to their first year of studies. The demographics of the students are:

- 130 students enrolled after successfully siting the competitive panhellenic exams for university entrance,
- ca. 70 students are transferred from other Mechanical Engineering departments in Greece based on social criteria,
- ca. 30 students are enrolled based on special requirements (such as distinction in sports, Cypriots, repatriation, etc.), and

- ca. 10 students that have graduated from eligible courses and successfully sit exams.

The school has a total of more than 1,500 active students (“n+2” students) and with a total of 42 faculty members, the student to faculty ratio exceeds 35, which is considered to be on the high end.

For a student to be awarded a degree (Integrated Master’s), she/he will have to complete a number of courses with a total of 300 ECTS within at least five (5) yeas of studies. A diploma thesis needs to be submitted and successfully defended. The Integrated Master is arguably equivalent to a Master’s Degree.

The school also participates in a number of interdepartmental post-graduate courses. Finally, the school offers graduate studies leading to the Doctorate. The PhD research is conducted within the appropriate section or laboratory. The minimum duration of the PhD studies is three years, and the maximum is six years.

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 FULFILMENT 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 realise 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, in order 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 labour 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

The NTUA as well as the school, following HAHE guidelines, have set a robust quality monitoring programme based on a well-articulated policy and strategy. The policy follows the standard laid out by HAHE. On that basis, there are two levels of quality monitoring, a higher one at the university level (through the MODIP) and one at the local level (through the OMEA set within the school). The school's quality assurance policy is in line with the university's quality policy.

With regards the ME UP, OMEA monitors student performance, student subject evaluations at the end of the semester through an electronic information system.

The school's quality assurance policy focuses on the achievement of set objectives (specified through a set of key performance indicators) related to the study programme offered. The school is committed to implementing a quality policy that supports its academic profile emphasizing fundamental training in Mechanical Engineering. The school's strategic objectives are aligned to the NTUA Strategic Planning; it describes the means and ways of achieving them, and it implements appropriate quality processes to ensure its continuous improvement. The school's quality management is aligned to the school's vision and has been specified in five (5) major pillars. Such key strategic objectives have been broken down in specific objectives and actions (18 in total).

The structure and organization of the curriculum are in line to the European Higher Education Qualifications Framework. Central in the update of the UP is the General Assembly of the school that approves changes proposed by the OMEA. The changes, as well as the approval process, are documented through the General Assembly minutes. The quality assurance policy is implemented with the engagement of faculty, administrators and students. Students' contribution is gathered and documented through the completion of end of course surveys. OMEA's operation with regards the update of the programme is deemed re-active, as there are no processes in place for pro-actively capturing the requirements from alumni, local authorities and industry stakeholders.

The EEAP evidenced the support from secretarial services and IT in the implementation of the quality assurance programme. The teaching staff has demonstrated ways of linking teaching with research and industry. The meetings with industry representatives and the local stakeholders highlighted the demand for graduates from the market, although such practices should be more systematic and documented in more detail.

The EEAP has concluded that the school's curriculum and its learning and teaching methods, meet the expected national and international standards of academic provision in the area of Mechanical Engineering.

Panel Judgement

Principle 1: Academic Unit Policy for Quality Assurance	
Fully compliant	**X**
Substantially compliant	
Partially compliant	
Non-compliant	

Panel Recommendations

- **R1.1**: Consider ways of increasing the students' participation in feedback surveys.
- **R1.2:** Consider more detailed annual progress reports by the OMEA.

Principle 2: Design and Approval of Programmes

INSTITUTIONS SHOULD DEVELOP THEIR UNDERGRADUATE PROGRAMMES FOLLOWING A DEFINED WRITTEN PROCESS WHICH WILL INVOLVE THE PARTICIPANTS, INFORMATION SOURCES AND THE APPROVAL COMMITTEES FOR THE PROGRAMME. THE OBJECTIVES, THE EXPECTED LEARNING OUTCOMES, THE INTENDED PROFESSIONAL QUALIFICATIONS AND THE WAYS TO ACHIEVE THEM ARE SET OUT IN THE PROGRAMME DESIGN. THE ABOVE DETAILS AS WELL AS INFORMATION ON THE PROGRAMME'S STRUCTURE ARE PUBLISHED IN THE STUDENT GUIDE.

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 organisation, 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 labour 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

The school has designed a study programme based on appropriate standards and current international practice. The basic factors that are taken into account in the design of the programme include, but are not limited to, the institutional strategy, the active participation of students, the anticipated workload according to the ECTS system, the linking between teaching and research, as well as the relevant regulatory framework.

The curriculum is quite extended, comprehensive and covers all scientific and technological areas related to the modern practice of Mechanical Engineering. Further, it follows appropriate accepted standards for studies in mechanical engineering. The structure of the study programme is articulated in a clear and comprehensive manner. The main features of this structure are the following.

- The first three years of study consist of courses in exact sciences (mathematics, physics etc), as well as basic, foundational courses in mechanical engineering.
- As the years of study advance, the courses become more technology-oriented and of more applied nature.

- The programme of the first three years consists almost entirely of compulsory courses (i.e. that all students must take), whereas there are many more optional courses in the 4th and 5th years.
- The students choose among four (4) well established options of study (study tracks), upon which their choices of optional courses are based.
- The last semester of study is devoted to the Master thesis, which counts for approximated 10% of the required ECTS for the obtention of the diploma.

These are also the basic features of the mechanical-engineering curricula across the European Union. In other words, the curriculum structure fully conforms to current practice and standards.

The procedure for periodic revisions of the study programme is very well described and analysed. Furthermore, this procedure is appropriate with respect to the mission of the school and the specific field of study (mechanical engineering). More specifically, the strategic objectives with regard to the study programme are elaborated by the school administration and management (*κοσμητεία*) which consists of the dean (head of the school), the sector heads and five elected faculty members, one of whom serves as a vice dean. More specifically, the administration implements a 5-year strategic plan, which provides a valuable guideline for the revision and evolution of the programme.

Revisions of the programme are then organized and implemented by the Committee of Study Programme (consisting of the dean plus the sector heads) and in collaboration with the academic and scientific personnel of the school and the Quality Assurance Unit of the Institution. Revisions are performed annually, which is in accordance with current standards. It is also positive that student representatives are offered the opportunity to participate in the Committee of Study Programme, even though the students have thus far not elected such representative. Additionally, it is very positive that the study programme undergoes a yearly internal evaluation by the quality assurance unit of the institution.

In the past, the number of courses required for the obtention of the Master (*δίπλωμα*) was too large (~70). However, through systematic efforts of the Committee of Study Programme, the number has now been reduced to 62 courses, which is quite more reasonable. The EEAP considers this as a very positive development, however, the number of courses can be further reduced.

Up until recently, the consultation of graduates, external experts and stakeholders with regards to the revisions of the curriculum has been performed on an informal basis. Recently however, the school has started to request the feedback of graduates and industrial stakeholders. This is a positive development and the Panel members strongly recommend that it be continued and expanded.

The EEAP acknowledges a tendency to replace basic-science courses of the first years (notably mathematics and mechanics) in favour of courses of more applied (technological) nature. However, it is through these basic-science courses that students acquire the necessary scientific background to eventually become modern-day engineers and decision makers. NTUA has a very good international reputation, and its graduates are renowned for their strong theoretical scientific background. This reputation can only be preserved and continue to hold true if

appropriate emphasis is placed on the size and content of the courses in the aforementioned basic sciences. The school should be updating their offerings so as to include subjects that are at the forefront of contemporary science and technology, such as Machine Learning, Artificial Intelligence and Computational Thinking.

Typically, in curricula of 5-year integrated master's in engineering, successful completion of certain early-year courses is prerequisite for registration in (a number of) compulsory courses of later years. In the past, prerequisites did exist in the Master's programme of the school of Mechanical Engineering; unfortunately, this is no longer the case. However, the lack of prerequisites disrupts the smooth progress of students, makes the teaching of advanced classes more difficult and results in many students being unable to follow them. Additionally, prerequisites act as a motivating factor for the timely completion of the courses of the early years of study. For these reasons, the Panel recommends their reintroduction.

Finally, the EEAP note the introduction of ``extraordinary examination sessions" during the academic year for students who are near completion of their studies. These sessions are in addition to the established 3 exam sessions and take place simultaneously with the teaching activities. The Panel members acknowledge that the administration of the School is not responsible for the introduction of this practice. Nonetheless, this practice interferes with and obstructs considerably the smooth progress of the teaching activities; for this reason, they recommend against it.

Panel Judgement

Principle 2: Design and Approval of Programmes	
Fully compliant	**X**
Substantially compliant	
Partially compliant	
Non-compliant	

The External Evaluation & Accreditation Panel agrees that this Programme leads to a Level 7 Qualification according to the National & European Qualifications Network (Integrated Master)	**YES**	**NO***
	X	

Panel Recommendations

- **R2.1:** The school is encouraged to expand the consultation of stakeholders, graduates and external experts on a systematic and regular basis. To this end, the introduction of an External Industrial Advisory Board (or an advisory board consisting of industrial stakeholders and external academics) would also be very beneficial.

- **R2.2:** The school is encouraged to maintain its robust portfolio of courses offered in mathematics and basic sciences.
- **R2.3:** The administration of the school should inform appropriate authorities (of the institution and/or ministry of education) about the negative impact of extraordinary exam sessions and request its abolishment.

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

The EEAP found clear evidence of the availability and deployment of a variety of modes of delivery of the material for each course – both in lectures and laboratory sessions – that offers students the flexibility to choose the learning path that works best for each of them. When asked about the quality of instruction and the commitment of the faculty and staff to their

learning, the interviewed students' responses were invariably very positive. Students have the opportunity to assess the effectiveness of teaching via surveys, and they also commented that informal, direct communications with teaching faculty and staff - typically via email - are carefully considered and responses are provided in a timely manner – on the same day or the next. Also, there appears to be good rapport between the student body and the faculty and staff which underlines the evident mutual respect that characterizes their relationship. The students are aware of the attendance and assessment criteria for each lecture and laboratory class. Also, a formal process for student appeals is well defined and available.

Students interviewed by the EEAP were nearly unanimous in their desire for more hands-on practice prior to graduation, and would also like to see a larger portion of the course grade be based on such activities. The relatively recent emphasis the school is placing toward increasing opportunities in this direction is noted. The EEAP applauds these efforts and recommends that such activities be both significantly increased and broadened. Increasing participation in student-led design projects (and competitions) such as the Formula Car, the efficient Bridge design, various robotic designs competitions, inverted classes, and others, will not only provide more opportunities for deploying inter-disciplinary classroom learning to real-world designs, but also develop their "soft" skills, such as communication, teamwork, leadership, and others, which will help them advance their professional careers.

Those of the students interviewed who had participated in ERASMUS and Internships spoke very positively about the value these experiences added to their preparation for their professional careers. The EEAP recommends that these opportunities be broadened and promoted to the student body.

Overall, the Panel found that the undergraduate programme in the school of Mechanical Engineering is substantially student-centred and promotes mutual respect between the students and the faculty and staff. Students feel that they have sufficient freedom to plan their academic path.

Panel Judgement

Principle 3: Student- centred Learning, Teaching and Assessment	
Fully compliant	**X**
Substantially compliant	
Partially compliant	
Non-compliant	

Panel Recommendations

- **R3.1:** Increase opportunities for students to gain more hands-on experience via design projects, increased laboratory engagement, and the like, and assign to such activities a significant portion/percentage of the appropriate course final grade.
- **R3.2:** Increase students' awareness of existing opportunities so that more of them apply for and participate in ERASMUS and Internships.

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

The school provides an orientation (welcome) day for all new students each year. As part of this orientation, the students have the chance to visit the school's laboratories. Furthermore, the students are informed on how to keep themselves updated through the website and the programme study guide. The programme study guide includes detailed information about the goals and structure of the programme. The students are appointed an advisor who is a faculty member.

The programme admits students with the highest entrance grades within Greece, although the school accepts students with lower grades transferred from other Mechanical Engineering departments in Greece. This results in a discrepancy in the students' background knowledge.

The student progression is not systematically monitored and reviewed. This is achieved informally through the relationship established between the advisor and the student, although this relationship and the frequency of the meetings are student led.

The programme does not have a provision for pre-requisite courses (successful completion of a course before moving to a more advanced one). A student can select courses on the basis of their student year and not on the basis of having successfully completed courses that are logically preceding. This can lead to issues in the syllabus to be covered within the course. The discussion with students indicated that they do not concur with such change, however the EEAP feels that such a change would benefit their understanding in the more advanced courses and help with their smooth study progression.

The programme follows the ECTS credit system which is applied across the course curriculum, which supports students' later recognition and certification.

Student mobility is encouraged via the ERASMUS programme, although the number of participating students is small. For both external relations regulations and processes are readily available to students.

An internship programme is available, being optional though for the students. Each internship is supervised by a faculty member appointed by the school.

Graduates are issued award certificates in both Greek and English, including an academic transcript which lists their achievements in detail. Prizes are offered for certain achievements. The number of prizes and scholarships available are among the highest in the Greek academic system.

Panel Judgement

Principle 4: Student Admission, Progression, Recognition and Certification	
Fully compliant	**X**
Substantially compliant	
Partially compliant	
Non-compliant	

Panel Recommendations

- **R4.1:** Establish a student progress monitoring process.
- **R4.2:** Actively encourage students to take advantage of the ERASMUS mobility programme.
- **R4.3:** Consider the establishment and enforcement of clear prerequisites within the study programme.

Principle 5: Teaching Staff

INSTITUTIONS SHOULD ASSURE THEMSELVES OF THE QUALIFICATIONS AND COMPETENCE OF THE TEACHING STAFF. THEY SHOULD APPLY FAIR AND TRANSPARENT PROCESSES FOR THE RECRUITMENT AND DEVELOPMENT OF THE 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 recognize 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

The school follows a rigorous procedure to recruit highly qualified teaching stuff following the national standards and available resources. It emphasizes the importance of teaching and research in the fields and domains defined periodically the school's strategy. Moreover, the school underlines to all its members the importance of producing scholarly work and linking research and teaching.

The professional development is supported by the institution and involves promotion to higher academic ranks by rigorous review procedures and following applicable laws and regulations, via research collaborations with local and international industry, acquiring research grants from the public and private sectors, participating in EU programmes as well as teaching and interacting with leading universities across the world.

The teaching workload of the teaching staff follows existing applicable laws and regulations across the country. However, the workload is on the high end as compared to very good European universities. The high workload inhibits mobility and reduces the efforts for the development of projects and the research output. Despite the high workloads, several staff produce excellent works in teaching and research. Nevertheless, the EEAP encourages the school to promote gender equality by increasing the ratio of female academic and support staff employed by the school. The EEAP understand that the current legislative framework limits the actions that the school could take on this front, however, the school should work on influencing and promoting changes.

There is substantial evidence of important linkage of research and teaching. This is manifested by the use of research laboratories as teaching laboratories. Such a link has several benefits in terms of student motivation, selection of important topics for projects thesis. In addition to enhancing the students' educational experience to greater depth, it contributes to the research mission of the school. Such an activity creates a very positive teaching environment with all

actors involved, i.e., teaching staff, postdoctoral researchers, doctoral and other postgraduate students as well as pre-diploma students work in a common environment. The school however, should increase the allocated budgets for teaching support personnel and reduce the existing bureaucratic barriers of procuring teaching support materials.

The school regularly evaluates the courses and teaching staff through end-of-term in-class paper surveys using an online system but is has a smaller student participation, rendering the results not very useful. Due to the low number of students' participation, the evaluations are not representative and the school should look for solutions to improve participation. The evaluation is transmitted to the OMEA that has the overview of the entire programme of study and its quality assurance and assures confidentiality as well as suitable constructive feedback for continued improvement of the programme and teaching staff.

Panel Judgement

Principle 5: Teaching Staff	
Fully compliant	
Substantially compliant	**X**
Partially compliant	
Non-compliant	

Panel Recommendations

- **R5.1:** While the teaching staff provide teaching and research output of high quality, it is important that the school reduce the administrative burdens to procure and provide support-teaching materials.
- **R5.2:** In addition, teaching will be improved by additional expert technical staff to support the teaching staff in their important mission to teach laboratory related and practical hands-on courses. The school should work with appropriate authorities to secure funds for additional technical staff.
- **R5.3:** The school should look for solutions to improve the students' participation in their evaluation of the programme and coursework and projects (relevant previous recommendation R1.2). This will provide further insight in the students' perception of teaching quality.
- **R5.4:** The school should also set a clear and unambiguous strategy to promote gender equality and attract female teaching staff members. This will allow developing a safer and healthier work environment and society and promote and more equitable economic prosperity. The administration of the school should work with appropriate authorities (of the institution and/or ministry of education) for promoting the gender equality agenda.

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

The EEAP finds that the school has adequate facilities to ensure an appropriate educational environment to conduct its mission in teaching and research. Major classrooms exist to accommodate large and small student groups. The IT infrastructure is adequate, well maintained and easily accessible to all students. The IT support personnel are available to assist students and staff. However, there is a lack of permanent audio-visual/IT support in classrooms which makes teaching more difficult for the teaching staff and less efficient for the students.

The library provides a strong means to obtain information on existing literature and knowledge. The students' support is easily accessible on the web page of the school, the laboratories and the study management tool of the School.

The school has the policy of using research laboratories as teaching laboratories. This policy has several substantive and pedagogical advantages. It allows for the transfer of contemporary research ideas and results to the classroom. That allows the student to be involved in research projects early-on in their university education. It also gives a strong motivational advantage for the students to relate theoretical knowledge with its application in research and development and eventually in engineering applications and technology transfer.

The school also supports laboratories in more basic disciplines such as fluids, materials engineering, aeronautics-specific disciplines and design, and therefore the review Panel considers that overall, the school has a good distribution of facilities. However, the Panel, after the discussions with the different stakeholders, noticed that there is a need for upgrading several such facilities.

NTUA as a whole has suitable boarding, dormitory, career counselling, student welfare and a well-supported student life in a dedicated and well-designed campus. In addition, the school further supports the above university-wide services for its specific student body through the introduction of the Academic Advisor, direct student to Staff contact and Practical Training opportunities. Nevertheless, discussions with the teaching staff indicated that only a very small percentage of the students reside in the university's dormitories.

The students are well informed of available services through a multitude of means, including internet resources, orientation presentations at the start of each academic year, personal contact to the school's secretariat, through the Academic Advisor and through the informal student networks and associations. The review Panel found that students have several opportunities to find out about available services which are easily accessible.

The review Panel was impressed by the high competence, and enthusiasm of the administrative staff to be as helpful as possible in its role to support the student in their questions and concerns.

Panel Judgement

Principle 6: Learning Resources and Student Support	
Fully compliant	
Substantially compliant	**X**
Partially compliant	
Non-compliant	

Panel Recommendations

- **R6.1:** Some laboratories and teaching facilities may need an extensive renovation, upgrade and hardware of a more modern form and functionality supplemented by contemporary technologies including IT and computer visualization. EEAP recommends that the state and institution allocate the necessary funds and/or use funds, often available from the surplus of the research projects (that are currently absorbed by the institution/state), to upgrade existing research, teaching and IT facilities.

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 organisation, 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 analysing 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 analysing information and planning follow-up activities.

Study Programme Compliance

The school has developed a comprehensive digital platform that services its educational programme. The platform includes all information on the courses offered, their schedules each semester and their instructors. Grades are uploaded electronically and become readily accessible to the students. Statistical information is derived automatically on various metrics such as teaching load, student participation in the courses, distribution among the different sectors etc. The platform serves the school well in providing readily a comprehensive view of the educational activities.

Information is collected and tracked on several key indicators for the student population, e.g., their choices of sector, their progress through the programme, participation in practical training, etc. Feedback from the students on the courses is obtained through course evaluation forms that are then systematically analysed. However, the participation of the students in the surveys is low. The school should seek and provide a platform for a single coordinated scheduling of the timetables to provide the students and staff the necessary efficiency and quality during the exam periods.

The school documentation provided to the Panel contains several tables and graphs summarizing information on the courses, the students, the faculty, and the teaching and research activities carried out in the school. They give a nice comprehensive overview of the

school and its activities. It illustrates the significant level and high quality of research activity of the faculty, and that this is true for all the sectors.
The information systems developed by the school help facilitate the smooth operation of the school. Furthermore, the collected information on the different education and research activities are essential in assessing the current state, identifying needs, and future planning.

Panel Judgement

Principle 7: Information Management	
Fully compliant	**X**
Substantially compliant	
Partially compliant	
Non-compliant	

Panel Recommendations

- **R7.1:** Continue to evolve the services platform and the information collection systems to address the school needs as they arise and use the information to continue improving the processes.
- **R7.2:** Develop an information system to track school alumni, to help connect with them and foster interaction between alumni, students and faculty.
- **R7.3:** The school should work with the university in adopting an appropriate software for the scheduling of timetables.

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

The school maintains a website that is clear, easy-to-navigate and well structured. All key information regarding the missions, activities and academic personnel of the School is available online. Also, in the School's website one can find detailed description of the features of the study programmes offered, such as structure, mode of attendance, assessment criteria, degrees awarded and CVs of the academic personnel. Detailed description, learning outcomes and mode of evaluation for all courses are also available online. Furthermore, the Policy for Quality Assurance is readily available online.

Additional positive aspects that research results and student activities of the School can be found in the magazine of NTUA (Προμηθεύς), as well as in popular social media such as *YouTube* and *Facebook*.

Panel Judgement

Principle 8: Public Information	
Fully compliant	**X**
Substantially compliant	
Partially compliant	
Non-compliant	

Panel Recommendations

- **R8.1:** It is recommended that the school provides information about its teaching personnel (*ΕΔΙΠ*) and PhD students on the School's website (CV, teaching activities, areas of research etc).

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 analysed and the programme is adapted to ensure that it is up-to-date. Revised programme specifications are published.

Study Programme Compliance

The QA system of the University addresses this principle thoroughly. There is an extensive data collection infrastructure in place for objective analysis of quantitative metrics along with qualitative assessment based on surveys of the students and staff. This collection of quality indicators includes data on enrolment, grades, course, and exam attempts, teaching load, faculty performance metrics, and other useful statistics. It is reported annually in a comprehensive report for review and analysis by the administration. Several years of this report were furnished as evidence of compliance of this criterion.

The school collect feedback on the programme content through a range of sources. These include feedback from direct interactions with external researchers and practitioners, by monitoring changes made to programmes at other universities, and the release of new textbooks. Some teachers are actively in contact with many external industrial and academic groups and have a high level of interaction, although the School does not provide such actions officially. Employers are generally very satisfied with the preparation of the students and feel that the programme provides an exceptionally strong foundational preparation for industrial practice. The Panel's interviews with employers confirmed this high level of interaction and alignment of the programme with their needs.

Changes to courses and the programme are evaluated and proposed through a formal process and is 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. EEAP evidenced that logged student responses to course surveys could stand to be improved; this is a challenge both for evaluating faculty as well as providing feedback on courses. One of the challenges discussed was that formal surveys are offered only at the end of the course which is too late to improve a course (this is seen by the students as the only function of the surveys and motivation to complete them). Offering a mid-term logged assessment could help improve this response and memorialize this feedback.

Student assessment in courses is well structured. The School has adopted a student-centred learning and teaching practice, which follows a modern model of course performance and student assessment. In some courses, 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.

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 in discussion offered their opinion that informal discussion with the instructors on course quality/workload/etc. was the most effective method of offering feedback.

Panel Judgement

Principle 9: On-going Monitoring and Periodic Internal Review of Programmes	
Fully compliant	**X**
Substantially compliant	
Partially compliant	
Non-compliant	

Panel Recommendations

- **R9.1:** Offer a mid-term logged assessment for the students to provide feedback on the courses so that timely adjustments can be made.
- **R9.2:** Expansion of the communication office and further engagement with the alumni network could strengthen many of the student interactions and provide avenues for more feedback on these principles.
- **R9.3:** Consider convening a formal industrial advisory board (R2.1) to offer more regular/structured feedback on the programme. Several of the alumni and industrial partners interviewed as part of this exercise expressed interest in further engagement of this type.
- **R9.4:** Focus on the development of soft skills for the students throughout the courses, as it is a disadvantage observed both by the alumni and the industrial partners.

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

All programmes of the school for AY 2009-2010 – undergraduate, graduate, and research – underwent an external evaluation process in 2012. Pursuant to that evaluation, the EC offered several Conclusions and Recommendations. The school has provided the 2021 EEAP with a complete self-assessment which describes the level of progress achieved by the School toward attainment of each item on that list. The 2021 EEAP appreciates this carefully prepared assessment. During the two 3-year periods following the 2012 external evaluation – 2012-2015 & 2015-2018, the school estimates that a little more than one-third of the recommendations (36%) have been substantially addressed – some completed, while good and ongoing progress has been achieved in others. The above self-assessment has excluded those recommendations associated with research and graduate programmes.

The EEAP appreciates the level of effort expended to achieve such progress, especially when viewed in the light of the workload carried by both the administration and the faculty and staff of the school, as well as the constraints placed by existing laws and regulations and by limited funding.

Taking into account all considerations outlined in the previous two paragraphs, the EEAP has settled on making the recommendations listed at Part C, III - Recommendations for Follow-up Actions of this Accreditation Report. The EEAP considers them critically important and recommends that they be pursued to their completion at the earliest possible time.

There is ample evidence that the school is fully aware of the importance and value added by the external accreditation process.

Panel Judgement

Principle 10: Regular External Evaluation of Undergraduate Programmes	
Fully compliant	
Substantially compliant	**X**
Partially compliant	
Non-compliant	

Panel Recommendations

- **R10.1:** Establish a regularly convening external Advisory Board (relevant previous recommendations R2.1 and R9.3). Members of the Board should include Senior Industry and Academic leaders.
- **R10.2**: Strengthen ties with employers - both in Industry and in Public and Private Organizations - through an Industrial Affiliates programme.
- **R10.3:** External evaluation process should take place on a regular basis.

PART C: CONCLUSIONS

I. Features of Good Practice

- Established quality assurance process.
- Cooperation between MODIP and OMEA.
- Support to students interested in practical training and internships.
- Appointment of academic advisors for each first-year student.
- Ties with the private and public sectors.
- Links with graduates.
- Positive atmosphere in the school.
- High quality research outputs.

II. Areas of Weakness

- The number of students enrolled every year exceeds the capacity of the department.
- High students/staff ratio.
- Gender equality: small number of female faculty employed by the department.
- A high percentage of laboratory equipment is relatively outdated.
- Not enough project-based learning opportunities.
- The student progress-monitoring procedures are not satisfactory.

III. Recommendations for Follow-up Actions

- Establish a regularly convening External Advisory Board.
- Establish a systematic student progress monitoring process.
- Consider ways of increasing the update of student feedback surveys.
- Expand opportunities for student internships.
- Actively encourage students to take advantage of the ERASMUS mobility programme.
- Strengthen ties with employers through an Industrial Affiliates programme.
- Consider more detailed annual progress reports by the OMEA.
- Enhancement of faculty member teaching practices on pedagogy and andragogy methods.
- Re-introduce prerequisites for compulsory courses of the 3rd and 4th years.
- More project-based learning opportunities for students, via design projects, increased laboratory engagement, and the like.
- Enhance the outreach efforts including the website, visits to schools and professional societies.
- Maintain a robust portfolio of courses offered in basic sciences.
- Eliminate the extraordinary exam sessions.
- Introduce a series of seminars to be delivered from external lecturers / industry representatives on the profession of a mechanical engineer and the latest developments.
- Update the diploma supplement as to reflect that the students are graduating with an Integrated Master's. According to EU terminology, 1st cycle of studies leads to the bachelor's degree. They should write "Integrated Master" in English or "*προπτυχιακό - 1ος και 2ος κύκλος σπουδών*".

IV. Summary & Overall Assessment

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

The Principles where substantial compliance has been achieved are: **5, 6, and 10**.

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

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

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

The External Evaluation & Accreditation Panel agrees that this Programme leads to a Level 7 Qualification according to the National & European Qualifications Network (Integrated Master)	**YES**	**NO**
	X	

The members of the External Evaluation & Accreditation Panel

Name and Surname **Signature**

1. **Professor Konstantinos Salonitis (Chair)**
   Cranfield University, United Kingdom

2. **Professor John Botsis**
   École Polytechnique Fédérale de Lausanne (EPFL), Switzerland

3. **Professor Emeritus George Haritos**
   The University of Akron, Ohio, United States of America

4. **Professor Miltiadis Papalexandris**
   Université catholique de Louvain, Belgium

5. **Mr Panagiotis Kiskiras**
   Member of the Technical Chamber of Greece, Greece