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HELLENIC REPUBLIC
HQA
HELLENIC QUALITY ASSURANCE
AND ACCREDITATION AGENCY

Accreditation Report
for the Undergraduate Study Programme
(Integrated Master) of the
Mechanical Engineering
University of Thessaly

November 23, 2019

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Επιχειρησιακό Πρόγραμμα
Ανάπτυξη Ανθρώπινου Δυναμικού,
Εκπαίδευση και Διά Βίου Μάθηση
Με τη συγχρηματοδότηση της Ελλάδας και της Ευρωπαϊκής Ένωσης



Report of the Panel appointed by the HQA to undertake the review of the
Undergraduate Study Programme (Integrated Master) of
Mechanical Engineering of the University of Thessaly
for the purposes of granting accreditation

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PART A: BACKGROUND AND CONTEXT OF THE REVIEW

I. The Accreditation Panel

The Accreditation Panel (AP) responsible for the Accreditation Review of the Undergraduate Study Programme (Integrated Master) of **Mechanical Engineering** of the **University of Thessaly** consisted of the following four members, drawn from the HQA Register, in accordance with the Law 4009/2011:

1. **Professor Nicholas M. Patrikalakis** (Chair)
Massachusetts Institute of Technology, USA
2. **Dr. Ioannis Michaelides**
Independent Expert in Academia, Energy and Innovation,
former Associate Professor at the Cyprus University of Technology, Cyprus
3. **Professor Konstantinos Salonitis**
Cranfield University, UK
4. **Mr. Konstantinos Tsanis**
Representative of the Technical Chamber of Greece (TCG),
Chair of the Thessaly Chapter of the TCG.

II. Review Procedure and Documentation

The Accreditation Panel (AP) visited the Department of Mechanical Engineering (MED) of the University of Thessaly (UTH) in Volos, during the period of November 18 to 20, 2019.

The AP arrived in Volos, on Monday November 18, 2019 and met the entire next day, November 19, with the Vice Rector of Research and Lifelong Learning of the UTH, Professor Laliotou, the Department Head, Professor Pandelis, the members of the Department's Evaluation Unit (OMEA), Professors Karamanos, Liberopoulos and Stamatelos, and the members of the Quality Assurance Unit (MODIP), Professors Karakasidis and Christidou. After introductory remarks by the Vice Rector, the meeting continued with presentations by the members of the Department's Evaluation Unit (OMEA). These presentations highlighted the Department's educational programs, past and on-going industrial collaborations, research activities of the Department's three Academic Divisions (TOMEIS), and those of each separate Laboratory (EPFASHTHPIO) within each Division. During these presentations, the AP requested and obtained sufficient additional and clarification information by the MED representatives.

During the same day, the AP met with eight members of the teaching staff beyond the faculty members identified in the previous paragraph, who withdrew from this meeting, i.e. Professors Agoras, Bontozoglou, Charalampous, Kermanidis, Papadimitriou, Papathanasiou, Pelekasis and Ziliaskopoulos. The AP carefully considered their points of view, their appraisal of MED's standing, as well as concerns about the MED's faculty recruitment, teaching policy, teaching load, performance of students, and their ranking at admission time to MED through the Pan-Hellenic exams. The discussions highlighted the following concerns perceived as impediments for the execution of MED's educational mission and its efforts for quality improvements:

- the increasing number of incoming new students, resulting from central government policies at variance with UTH yearly quota proposal to the Ministry of Education and Religious Affairs, and
- the students not graduating after 7 years of studies (5+2).

The faculty are gratified by the prospect of the start of construction of a new modern building for the Department early in 2020, an essential long-overdue infrastructure project, expected to be delivered in less than three years. This will greatly improve educational, laboratory and office spaces that are presently constrained by the available infrastructure.

The AP next met with 11 students (amongst which 3 female students) from all years of the program. The students were articulate, and exhibited genuine interest in the academic program, including its hands-on laboratory, practical training and diploma thesis components. Such discussion was invaluable for the AP to better appreciate the educational 5-year Integrated Master program, leading to the Diploma in Mechanical Engineering. The students are happily involved in their program of studies, their personal easy access to their faculty instructors, and the genuine interest faculty members exhibit for a strong educational experience of their students. In summary, academic staff and students together did show enthusiasm and esprit-de-corps, that was gratifying to the AP.

The above meeting was followed by online video-conference and in-person discussions with six MED graduates, three working in industry in Greece, two working in industry in the UK and the

Czech Republic and one in academia, working as Lecturer in the UK. The AP was positively impressed by their vigorous pursuit of professional success in diverse sub-fields of Mechanical Engineering grounded on their fundamental and applied educational background and skills acquired in the course of their studies. This was a strong positive element illustrating the quality of MED's educational program.

The visit of this first day concluded with a final online video-conference and in-person discussions with four employers and professional partners. The AP found satisfaction with the skills and education of the graduates of the program working in their companies in various sub-fields of Mechanical Engineering.

The morning of the second day, November 20, was devoted to visits of a few selected physical laboratories (having a research and educational mission), classrooms during lecture hours, a student computer room dedicated to educational instruction. The laboratories visit included demonstrations of their capabilities with a series of presentations by faculty, graduate and undergraduate students working on their theses. The AP carefully also considered documents provided by the Department (all in Greek unless stated otherwise):

- Departmental accreditation proposal
- Quality control policy
- Strategic objectives of the program of studies
- Studies guide
- Undergraduate studies regulations
- Course outlines
- Data on personnel, finances on research and infrastructure, scientific output
- Research activities booklet (in English)
- Additional supplementary information
- E-copies of all presentations delivered during the visit

The AP also obtained information from the university and departmental webpages and asked for clarifications and further information, all of which were promptly provided by the departmental leadership.

All meetings took place in a professional and cordial academic atmosphere. Faculty, students, and staff were forthcoming and cooperative in their participation in the evaluation process and frequently exhibited pride and enthusiasm about MED. The quality of documents was high and presentations were thoughtful, informative and responses to questions were well-thought out and thorough.

The AP members would like to thank the UTH Vice Rector of Research and Lifelong Learning, Professor Laliotou, the Department Head, Professor Pandelis, the members of MED's OMEA, Professors Karamanos, Liberopoulos and Stamatelos, and the members of UTH's MODIP, Professors Karakasidis and Christidou as well as all individuals who participated in the discussions and presentations of the Department.

The assistance and organization of the visit to the Department by the HQA is also gratefully acknowledged.

III. Study Programme Profile

The Department was founded in 1985, as part of the School of Engineering of UTH and admitted its first class of undergraduate students in 1990. The Department's teaching goal is to educate Mechanical Engineers in a five-year Integrated Master's program including the preparation of a Diploma Thesis. Its graduates are expected to be able to work with and introduce new technologies and to develop and manage efficient production processes in industry.

The Department is structured in three Academic Divisions, each with several laboratories, all with a research and educational mission, as below:

1. Division of Energy, Industrial Processes and Pollution Abatement Technology

- Laboratory of Alternative Energy Conversion Systems
- Laboratory of Fluid Mechanics and Turbomachinery
- Laboratory of Thermodynamics and Thermal Engines
- Laboratory of Transport Processes and Process Equipment

2. Division of Mechanics, Materials and Manufacturing

- Laboratory of Manufacturing
- Laboratory of Materials
- Laboratory of Mechanics and Strength of Materials
- Laboratory of System Dynamics

3. Division of Production and Industrial Management

- Laboratory of Production Management
- Laboratory of Systems Optimization

After competitive Pan-hellenic entrance exams, admitted students are awarded a degree titled Integrated Master after five years of successful studies, a practical training experience in industry of at least two months, and submission of a satisfactory Diploma Thesis. The Department also offers a graduate program leading to a PhD degree. Starting with academic year 2018-2019, MED finally offers two post-graduate programs in *Analysis and Energy Management Systems (AMES)*, and in *Supply Chain Management and Logistics (SCML)*.

The Integrated Master is arguably equivalent to a Master's Degree. The number of ECTS hours (comparable to European engineering schools), the depth, structure and delivery methodology of the educational program, the academic staff qualifications and the relevant infrastructure including laboratory, computer, teaching and library facilities justify this characterisation.

The Department is staffed with 20 faculty members (DEP) and has a total of 930 active students ('(5+2)' students). This gives a student to faculty ratio of 46.5. This ratio is considered to be on the high end of the customary range for similar departments in Greece.

Overall, the AP was impressed by the level of competence of students and faculty, the quality and quantity of research output, and, especially, their high “esprit-de corps” despite the difficult socio-economic constraints.

The Internal Accreditation Proposal (IAP) was prepared by MED’s OMEA and was available to the AP prior to its visit. The AP feels that the submitted proposal provided a candid assessment and covered in sufficient detail the 10 principles outlined in the Mapping Grid as provided by the HQA.

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

UTH as a whole has a well-established quality assurance policy and the corresponding mechanism which follows the standards of the HQA. MED's quality assurance policy is fully in line with the University's policy on quality and its assurance. It focuses on the achievement of the set objectives related to the study programs offered. The Department is committed to implementing a quality policy that supports its academic profile emphasizing fundamental training of Mechanical Engineers, through a compact, high-quality, and contemporary workplace-focused curriculum. MED promotes the training of engineers capable of meeting the challenges of the European and International market, as well as the research and development

market. MED's strategic objectives are aligned to UTH Strategic Planning; it describes the means and ways of achieving them, and it implements appropriate quality processes to ensure its continuous improvement. A number of Key Performance Indicators (KPIs) related to the improvement and upgrading of the education process are systematically monitored.

MED has established procedures adhering to HQA policy, that promote educational advances focused on the promotion of the quality and effectiveness of the teaching work. This is accomplished by judicious synergy of research and education. The appropriateness of the structure and organization of the curriculum, as well as the pursuit of learning outcomes and qualifications in accordance with the European Higher Education Qualifications Framework are also addressed.

The update of the course is ensured through the internal quality procedural steps on a continuous basis. The required modifications are approved by the General Assembly of the Department, in which representatives of the students are entitled to participate. Although local authorities and industry stakeholders are not officially engaged, their opinion is taken into consideration through contacts that the faculty has established with them. MED's General Assembly approves significant changes or improvements. This presents a structure for continuous improvement of delivered program.

Furthermore, good evidence is provided that MED is committed to apply quality procedures that will demonstrate the appropriateness of the qualifications of the teaching staff in relation to the educational work assigned to it by the Department, ensuring completeness and impartiality in student assessment procedures. Furthermore, the procedures in place promote the enhancement of the quality and quantity of the research output among MED's faculty members.

Support services such as secretarial support, traineeship support etc. are key in the implementation of the quality assurance program. Emphasis is placed on the quality of these support services through the capabilities offered by IT and lifelong training of support staff in new technologies. MED has put into practice quality procedures that demonstrate ways of linking teaching with research and industry, and the demand for graduates from the market. MED's OMEA has a schedule for carrying out annual reviews and internal audits in collaboration with UTH's MODIP. The leadership of the Department, as well as individual staff members, have taken on successfully their responsibilities in the IQAS to achieve the continuous improvement of teaching and learning, research and innovation.

MED's quality assurance policy is implemented with the engagement of faculty, administrators and students. Starting from the Academic Year 2018-2019, in the context of welcoming new students, the Department Head informs the students about the Quality Assurance Policy. It is also publicised on the departmental website.

Overall, AP's opinion is that the department is well organized with respect to internal annual quality assessment of all aspects of its mission and supporting services. AP feels that the level of cooperation between MODIP and OMEA is satisfactory.

Panel Judgement

| Principle 1: Institution Policy for Quality Assurance | |
|--|----------|
| Fully compliant | x |
| Substantially compliant | |
| Partially compliant | |
| Non-compliant | |

Panel Recommendations

1. Establishment of an Advisory Board, to strengthen the MED links with industry and other stakeholders. The Advisory Board would provide feedback on the study program.

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

MED has a clearly defined mission, which complies with the current legislative framework that regulates the profession of the Mechanical Engineer in Greece, and focuses on the comprehensive undergraduate education of engineers, with a widespread scientific background to provide graduates with abilities in designing, improving and maintaining mechanical systems, structures and processes. More specifically, MED's mission is to provide high-level training in Mechanical Engineering, to produce state-of-the-art knowledge and knowhow, and to transfer this knowledge for the benefit of society, at a local, national and international level.

The Department has developed a modern and integrated undergraduate curriculum enhancing the laboratory character of studies, the training in the use of IT tools, the support of courses through the web development (e-class), and the creation of quality culture.

For the elaboration of the current programme, MED has seriously taken into consideration the recommendations provided by the External Evaluation Committee in 2011. Following the latest revision, the number of courses required for the Diploma has been reduced from 52 to 45. A new course on Physics has been added following the recommendation of the Accreditation Report of 2011. Of the 45 courses required for obtaining a diploma, 38 are compulsory, 3 are mandatory from a list of specialisation courses and 4 are from a list of electives. Students completing the 3rd academic year are enrolled in the 4th year if they have passed 23 of the 30

courses of the first three years ones (8 of the 23 courses should be taken from a specific list of 12 main courses).

The Department seeks to enhance the learning outcomes of the program of studies in collaboration with stakeholders, through a number of actions such as educational visits, practical training, and preparation of diploma theses.

The program design takes into consideration the institutional strategy, the active participation of students, and the experience of external stakeholders. The smooth progression of students throughout the stages of the program is key in the design of the program. The Department has set a number of KPIs including targets to be achieved by the end of August 2020.

Due consideration is also given to the anticipated student workload according to the European Credit Transfer and Accumulation System, offering work experience to the students through practical training of at least 2 months in duration. The linking of teaching and research, the relevant regulatory framework and the official procedure for the approval of the program by the institution are also considered.

Panel Judgement

| Principle 2: Design and Approval of Programmes | |
|---|----------|
| Fully compliant | x |
| Substantially compliant | |
| Partially compliant | |
| Non-compliant | |

| The 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

- 1 Establishment of an Advisory Board, to strengthen the MED links with industry and other stakeholders. The Advisory Board would provide feedback on the study program.
- 2 Establishment of a Council of Department Heads of Mechanical Engineering and related departments from all universities in Greece. Consider participation in respective Pan-european councils.

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 faculty claims to address this principle, through a number of initiatives / policies that they have established over the years, such as:

- Faculty open door policy
- Flexible diploma thesis routes
- Setting up of homeworks for supporting their learning
- Participation in student mobility programs (Erasmus)

- Industrial educational trips
- Extra-curricular activities such as the Formula SAE team
- Small working groups in labs
- Promotion of use of virtual learning environments
- Use of case studies
- Introduction and training of students in specialized engineering tools and software

The discussions with the members of OMEA and the students highlighted that the faculty members are aware of the needs of the students and the fact that each student might have a different preference in terms of how they learn. Different teaching methods and techniques are mixed in order for students with different learning preferences to better achieve the intended learning outcomes. Examples given by the members of the OMEA include lecturing with or without slides, use of case studies, and laboratory exercises. As is the case with most universities in Greece, faculty members have not been formally trained on different pedagogical methods that can be used in a university setting.

The department has a policy in place for collecting feedback through a survey from students at the end of each semester. Students are invited to provide feedback based on their attendance. The feedback is discussed at the Academic Division level, in their assemblies.

Project based learning (such as the participation in the Formula SAE team) reinforces students' sense of autonomy. The team is led by an academic supervisor, it is interdisciplinary and allows the development of the soft skills (presentation, communication and writing skills) of the students beyond their technical knowledge development.

The discussion with the students' representatives provided useful information on the teaching and student-teacher interaction. The students mentioned that all faculty members are available when needed and supportive. Furthermore, an "academic advisor", who is a member of the faculty, is assigned to each student during their first year of studies. The academic advisor supports the students with monitoring their progress and discussing their options with regards to selection of the Academic Division to join, the elective courses to enrol to and the thesis subject and supervisor.

The discussion with the students also indicated the process for dealing with students' complaints. This is effective but not formalized or documented. The students, whenever there is a complain, they contact the relevant faculty member and arrange a meeting to discuss the issue.

For each course, a course descriptor is available. The intended learning outcomes, the syllabus, the assessment methods and criteria are documented in the course descriptor. Students are provided with this information in advance. The *Studies Guide* describes the exam regulations. However, the moderation of the grading of the exam papers is not foreseen.

Panel Judgement

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

Panel Recommendations

1. Enhancement of faculty member practices on pedagogy and andragogy methods for higher education through seminars and workshops.
2. Formalization of practices that are well informally followed but not yet formally documented in the studies guide and regulations, such as the complaints process, and the moderation of exam papers grading.
3. More project-based learning opportunities for students to participate.
4. Capitalize on the Academic Advisor role for enhancing student motivation in the early years of the program, for career development, etc.

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

Following registration of incoming students in early October of each academic year, there exists a formalized welcome reception for such students including an overall presentation describing the Department by the Department Head, followed by presentation of the program of study by Education Program Committee faculty and the Directors of Academic Divisions. This introduction is enhanced at the individual student level through the Academic Advisor, who is a principal contact point of faculty and students, providing academic advice to individual students. The role of the Academic Advisor is key to the facilitation of the transition of students to the environment of university education, to explanation of undergraduate student obligations, and especially student studies planning. The AP finds that vigorous pursuit of academic advising to individual students would have a significant effect on reducing the studies delay during the first three years of the program and significantly increase graduation rates within a reasonable time frame.

MED has adopted an electronic academic records system, that provides a secure archive of the progress of each student in terms of class grades, completion of Practical Training, and the completion, presentation and grading of the Diploma Thesis. This integrated IT system allows the Department to issue a bilingual Diploma Supplement in Greek and English that includes the subjects taken, their corresponding credit units, the grades achieved as well as the corresponding information for Practical Training and Diploma Thesis. Such supplement provides reliable information for the content of each student's program of studies as well as their scholastic aptitude.

Student mobility is encouraged by the Department via the opportunity of completion of part of their studies in partner Universities in the EU or other countries, and the regulations of such student activity are clearly provided through the Erasmus page of the online Student Guide. The

Studies Guide explains the process of credit units transfer from another University to UTH. MED through its internal regulation reflected in the Studies Guide has set requirements for practical training, diploma thesis, and studies abroad.

A practical training program is in place. A network, including alumni with leadership roles in industry, members of the Association of Hellenic Industries, the TCG Thessaly Chapter, play a crucial role in sustaining a professional, social and cultural network, supporting the Practical Training program. Following their graduation, students participating in this program are frequently offered employment opportunities in the industry in which they worked for their practical training. This contributes to student motivation and the overall success of the program, and provides a head-start of students' careers.

Panel Judgement

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

Panel Recommendations

None

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

MED encourages professional development of teaching staff with various methods, such as visits to other universities and industry during leaves of absence, including opportunities for involvement in EU projects that contribute significantly to transfer of research results to the educational enterprise. Teaching staff qualifications for promotion to higher academic ranks is facilitated by research collaborations with other academic entities and industry.

The teaching workload of the teaching staff generally follows existing applicable laws and regulations, but is on the high end of the permissible range. This is affected by the difficulty in recruiting new faculty during the economic crisis period, although this is recently counteracted by the hiring of three faculty members leading to a total of twenty tenure-track faculty. The workload is also affected by leaves of absence without pay of key faculty as well as sabbatical leaves.

There is evidence of significant linkage of research and teaching facilitated by the use of research laboratories as teaching laboratories. This has many positive effects for student motivation, selection of relevant topics for student diploma theses, all of which strengthen the student educational experience and contribute to the research objectives of the Department.

Initially, the Department regularly evaluates subjects and teaching staff through end-of-term surveys (involving actively involved students attending lectures), a very good practice in obtaining a valid and meaningful sample for class evaluation. This is a good practice than a more general online survey that allows evaluation by all registered students in a certain subject, a population that includes non-active students. This survey information is discussed at the end of each semester at informal faculty meetings of each Division, that allows fine-tuning of the program and encourages uniformity of standards for content, method of delivery, and grading across the program. Survey information is transmitted to OMEA that has the overview of the

entire program of study and its overall quality assurance. Process confidentiality and feedback for continued improvement are therefore assured.

Panel Judgement

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

Panel Recommendations

1. Development of elective courses on the basis of faculty expertise and current research interests (motivating faculty members who have joined the department since the previous evaluation to develop these courses).
2. Development of a succession plan for faculty recruiting that should be aligned to the department's mission and anticipated scientific developments.
3. Continuation of the departmental practice of avoiding recruiting the department's own PhD graduates as faculty members.

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 AP had the chance to visit a number of teaching facilities (including laboratories and lecture rooms) during the accreditation visit. The department's facilities at this stage are not adequate and show their age. The major issue are the teaching rooms, which are in two temporary buildings. A computer room with limited working seats (24 computers) is available. However, the number of students enrolled in the program every year exceeds 100, posing challenges in scheduling the computer room. The computer room, as a result of these limitations, is accessible to students only during lecture hours. IT support staff are present to assist students and staff.

The positive news is that a new building is planned for MED that will significantly upgrade the available teaching facilities. The new building will be of 16,150 m² that will provide space for 10 laboratories, 15 teaching rooms, 2 auditoria and 67 offices for academic and administration staff.

MED faculty is associated with one of the three Academic Divisions that are organized into ten laboratories. The Department has the policy of using research laboratories as educational laboratories and this has multiple substantive and pedagogical advantages. It allows transfer of the latest research approaches and ideas to the classroom and permits students to be involved in research projects early-on in their University education. It also serves as a strong motivational

advantage for the students who are then able to connect theoretical knowledge with its use in research and development and to some extent in engineering practice.

UTH as a whole has a career counselling office (*Bureau of Career and Employment*), student welfare directorate (including accommodation, catering and transport services), psychological counselling, sports (physical education office) and cultural facilities. The Department in addition through the introduction of the Academic Advisor further supports the above university-wide services for its student cohort.

The challenge that UTH administration faces is the fact that it has to operate within five campuses in five different cities (Volos, Larissa, Trikala, Karditsa and Lamia).

All the information on the available services is included in the “studies guide” as well as on the university’s website. Students thus are well informed of the services. Furthermore, the department’s secretariat, the academic advisors and various student associations help with the dissemination of such information. AP discussions with students during the visit further verified that students are aware of these services and that they are easily accessible.

Panel Judgement

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

Panel Recommendations

1. Agree on a strategic plan for the development of the department
2. Plan the new building’s laboratories and how these will be equipped with state-of-the-art facilities including fund raising.

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 analyzing information and planning follow-up activities.

Study Programme Compliance

MED has a series of tools and systems in place, through which they collect information about students, faculty and staff, infrastructure, organization and quality of teaching, as well as availability and offering of services. The AP recommends that the information system should be further developed to collect on a continuous basis, data for various indices, results of surveys and comparative evaluations. Due to lack of time, the AP did not have opportunity to visit the administrative offices, and obtain a first-hand overview of the information system. Therefore, our knowledge about such system is indirect.

Panel Judgement

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

Panel Recommendations

1. Continue the current excellent practice of maintaining active alumni relations.

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 Department provides adequate information about its activities, including the programs they offer, the intended learning outcomes, the degrees awarded, the teaching, learning and assessment procedures used, the learning opportunities available to their students, as well as graduate employment information. The diffusion of information is mainly carried out through the Departmental webpage, regularly maintained in Greek and English, as well as through the respective sites in social media (Facebook, LinkedIn). The website also provides News, Events and Announcements. Regular maintenance of these sites is carried out by one IT staff member, in collaboration with administrative staff, under faculty guidance.

The MED Studies Guide, in both Greek and English, is uploaded on the above site, but it is also distributed to all first-year students along with other material.

The Department places considerable emphasis to strengthen its relations with its alumni, and former postdocs and technical staff.

Well-designed brochures and booklets are produced and distributed to relevant stakeholders such as for example the booklet on Research Activities which provides a brief description of the research facilities of the department as well as the faculty members and their main research activities and achievements.

The Centaurus Racing Team, founded in 2009 from 6 students of the Department of Mechanical Engineering, participates in Formula Student competitions where it has won several prizes for design and engineering of racing cars. This is an excellent idea as it gives the opportunity for students to present their ideas to professionals as well as to the general public. This allows the students to compete with other university peers, educating them into working as a team and in a competitive environment. This helps them develop their sense of pride about their academic achievements and their university's standing.

Panel Judgement

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

Panel Recommendations

1. Update the website format.
2. Ensure that both Greek and English versions of the website present the same essential information.
3. Engage in more outreach activities to promote the department in local community, such as schools, professional associations etc., using major undergraduate projects, such as the Formula SAE team.

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 self-assessment procedure that has been set by the department is rather informal, however it is effective and fair. The process is outlined hereafter:

- at the end of each semester, the three academic divisions of the department hold **informal** meetings to discuss the effectiveness of the delivery (achievement of intended learning outcomes, fulfilment of syllabus requirements, students' feedback and evaluation reports and communication of best practices)
- an annual **informal** meeting at the department level is held for communicating the outcomes of the academic divisions' meetings and conclusions

Although the above-mentioned practice captures faculty and students' feedback, the AP believes that this does not necessarily capture the needs of the society as well as the latest practices in other universities. On the other hand, the faculty members claim that through their personal relationships with external stakeholders both in the local society and internationally, the department is informed and whenever needed introduces changes. The AP values that this is a powerful source of intelligence however, a formal process for capturing these "voices" would benefit the department.

The ongoing monitoring of the quality is the responsibility of the OMEA that currently consists of three experienced faculty members. OMEA is in close cooperation with MODIP as in HQA policy. AP was positively impressed by OMEA's professionalism and rigorous work.

Panel Judgement

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

Panel Recommendations

1. Setting up an advisory board for capturing the requirements and expectations from the industry stakeholders.
2. Formalize the monitoring and follow up process.

Principle 10: Regular External Evaluation of Undergraduate Programmes

PROGRAMMES SHOULD REGULARLY UNDERGO EVALUATION BY COMMITTEES OF EXTERNAL EXPERTS SET BY HQA, AIMING AT ACCREDITATION. THE TERM OF VALIDITY OF THE ACCREDITATION IS DETERMINED BY HQA.

HQA is responsible for administrating the programme accreditation process which is realised as an external evaluation procedure, and implemented by a committee of independent experts. HQA 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

MED has been evaluated though an external panel organized by the HQA that issued its report on January 2011, highlighting a number of positive characteristics. The recommendations proposed by that panel could be categorized into two groups; those addressable at the departmental level and those requiring governmental policy changes. A significant portion of the departmental level recommendations were satisfactory addressed since then.

In 2015, UTH as a whole underwent an external evaluation with a positive outcome, that led to the HQA's institutional evaluation certificate.

MED has had a quality assurance working group for some time before the setup of MODIP and OMEA at UTH. The department shows strong awareness of the quality assurance issues. They have been conducting annual internal evaluations and the reports are published online on MED's website. Furthermore, the follow up process seems to be well established, especially with regards the evaluation of the teaching delivery, as the outcome of the evaluation reports are discussed in the Academic Divisions' faculty meetings of the department.

Panel Judgement

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

Panel Recommendations

PART C: CONCLUSIONS

I. Features of Good Practice

- Cooperation between MODIP and OMEA.
- Compliance to the recommendations of the 2011 External Evaluation Report.
- Faculty open door policy.
- Support to students interested in practical training.
- Appointment of academic advisors for each first-year student.
- Adoption of teaching methodologies based on virtual classroom platform (e-class).
- Ties with the private and public sectors.
- Links with graduates.
- Positive atmosphere in the Department.
- Established quality assurance process.
- Hands-on projects for students.
- Practical training part of the program.
- High quality research outputs.

II. Areas of Weakness

- The number of students enrolled every year exceeds the capacity of the department.
- High students/staff ratios.
- Gender equality: no female faculty employed by the department.
- A high percentage of laboratory equipment is relatively dated.

III. Recommendations for Follow-up Actions

- Efforts should be undertaken to hire qualified female faculty in the Department.
- Establishment of an Advisory Board.
- Establishment of a Council of Heads of Mechanical Engineering departments.
- Enhancement of faculty member practices on pedagogy and andragogy methods.
- Formalization of practices that are informally followed but not yet documented.
- More project-based learning opportunities for students.
- Development of elective courses to capitalize on new faculty.
- Development of a succession plan for faculty recruiting.
- Develop a strategic plan for the development of the department
- Maximize the opportunities offered by the new building for labs.
- Enhance the outreach efforts including the website, visits to schools and professional societies.

IV. Summary & Overall Assessment

The Principles where full compliance has been achieved are Principles No.: 1, 2, 4, 5, 8, 10

The Principles where substantial compliance have been achieved are Principles No.: 3, 6, 7, 9

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 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 Accreditation Panel for the UGP (Integrated Master) of
Mechanical Engineering of the University of Thessaly**

Name and Surname

Signature

Professor Nicholas M. Patrikalakis

Massachusetts Institute of Technology, USA

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