



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
HELLENIC REPUBLIC



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

**Mineral Resources Engineering
Institution: Technical University of Crete
Date: 2 July 2023**

Report of the Panel appointed by the HAHE to undertake the review of the Undergraduate Study Programme (Integrated Master) of **Mineral Resources Engineering** of the **Technical University of Crete** for the purposes of granting accreditation.

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PART A: BACKGROUND AND CONTEXT OF THE REVIEW

I. The External Evaluation & Accreditation Panel

The Panel responsible for the Accreditation Review of the Undergraduate Study Programme (Integrated Master) of **Mineral Resources Engineering** of the **Technical University of Crete** comprised the following five (5) members, drawn from the HAHE Register, in accordance with Laws 4009/2011 & 4653/2020:

- 1. Prof. Ioannis P. Androulakis (Chair)**
Rutgers, The State University of New Jersey, USA

- 2. Prof. George P. Demopoulos**
McGill University, Montreal, CA

- 3. Mr. Georgios Kornelakis**
Technical Chamber of Greece, GR

- 4. Prof. Panos Papanastasiou**
University of Cyprus, Nicosia, CY

- 5. Mr. Michail Voskakis**
Hellenic Mediterranean University, GR

II. Review Procedure and Documentation

The review was conducted at Chania, Crete, Greece. It was organized and coordinated by HAHE with the help of the School of Mineral Resources Engineering, Technical University of Crete. The schedule and agenda of the review were as follows:

Tuesday, June 27, 2023

- a) Preliminary private meeting of the Panel
- b) Meeting with the Vice-Rector/President of MODIP and the Head of the School
- c) Meeting with OMEA and MODIP representative
- d) Meeting with teaching staff members
- e) Private debriefing (Panel members only)

Wednesday, June 28, 2023:

- a) Meeting with students
- b) Visiting laboratories and other facilities, discussion with laboratory, teaching and administrative staff
- c) Meeting with employers and social partners
- d) Private debriefing (Panel members only)
- e) Meeting with OMEA & MODIP representative
- f) Closure meeting with Vice-Rector/President of MODIP, Head of School, OMEA and MODIP

Thursday, June 29 – Saturday, July 1, 2023:

Report writing (Panel members only)

In preparation for the visit, the Panel received a multitude of material that included background information on accreditation, detailed data related to the program under evaluation, and operational and educational data, as well as presentations used by the Vice-Rector, the Head of the School and OMEA/MODIP. The Panel was in close communication with OMEA and MODIP representatives, who were very accommodating in providing additional information. The Panel also found that OMEA and MODIP representatives, as well as the faculty, students, and staff interviewed, were eager and helpful in providing all information requested by the Panel.

III. Study Programme Profile

The School of Mineral Resources of the Technical University of Crete (TUC) was founded in 1983 and admitted its first students in 1987. The duration of the studies is five years and awards a “Level 7 Integrated Masters”. It is currently one of the five engineering schools that comprise the TUoC. The overarching mission of the School is to train engineers to perform a wide spectrum of scientific/technological activities, aiming to identify, explore and utilize mineral raw materials and energy resources in a sustainable way. The School of Mineral Resources Engineering puts a strong emphasis on the development of novel disciplines or subjects that have not been adequately developed up to now in Greece. The School also offers post-graduate programs leading to MSc and PhD degrees.

The mission of the School is to empower students with diverse skills of high-quality enabling research, exploitation, and utilization of mineral raw materials, energy resources, geotechnics, and environmental geotechnology, in Greece and Internationally.

The School comprises the following three administrative divisions, each of which includes a number of related areas of specialization:

- Division of Positioning and Exploration of Mineral Resources
- Division of Mining Technology
- Division of Minerals Exploitation

The education provided prepares students to address a wide range of problems associated with research, exploration, and utilization of mineral resources as well as the development of sustainable and environmentally friendly mineral engineering processes. The School has 14 (2 females) Professors, one Associate Professor, and 4 (1 female) Assistant Professors. There are 18 Laboratory Teaching Staff members (8 female); four (2 female) Special Technical Laboratory Staff members. Two administrative staff members (one female) support the School’s activities. The School has 12 laboratories and 8 research units, offering students the necessary tools for developing their skills.

The panel's task was to evaluate the undergraduate educational program; therefore, this report will heavily focus on undergraduate student preparation. The duration of the studies is five years (10 semesters). The curriculum’s common core is taught during the first six semesters. During semesters 7, 8 and 9, students can choose courses focusing on one of 3 areas of specialization based on their personal interests: 1) Mining & Geotechnics 2) Processing of Industrial Minerals and Ores, and 3) Energy Resources Exploitation. The ECTS distribution is as follows:

Semesters 1 & 2: 34 + 32/33 ECTS

Semesters 3 & 4: 32/33 + 30 ECTS

Semesters 5 & 6: 32 + 33/34 ECTS

Semesters 7 & 8: 28 + 29 ECTS

Semesters 9 & 10: 29/30 + 30 ECTS

The total number of ECTS is in the range of 309-313, leading to a “Level 7 Qualification” (Integrated Master) in all areas of specialization.

The number of incoming (1st year) students over the period 2016-2020 covered in the submitted documentation was steady at circa 120/year, which however dropped significantly recently as we found out during the site visit down to 44 in 2022. This seems to be the result primarily of the recent introduction of a minimum passing score/grade during the country-wide entrance examinations. Additional contributing factors to this decline in intake cohort numbers may be the not well-known job of minerals resources engineer in the Greek society, the job prospects, and the general appeal of the discipline among today's youth. This issue should be a matter of priority reflection for the School and TUC. However, the number of currently enrolled students (1,128 as of 2021) far exceeds the expected number. This is due to the fact that a significant number (359 according to 2021 data) have exceeded the regular duration of their studies (5 years) by more than two extra years. However, as of now, the School has no control over this issue.

The School's facilities are appropriate, occupying a total of 10,500 m². They include faculty offices as well as research and teaching laboratories. Despite the fact that teaching laboratories and equipment are adequately functional, maintenance is lagging. It is therefore highly recommended that the central administration of the TUoC seriously considers allocating funds for an overall renovation of facilities.

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 organisation 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

Findings: The School of Mineral Resources Engineering's mission is reflected well in the structure and the expected outcomes of the undergraduate programme and the means to achieve them. Teaching effectiveness is assessed by regularly monitoring student progress and student satisfaction. The Internal Evaluation Group (OMEA) and the Institution Quality Assurance Unit (MODIP) review the programme's performance annually and communicate their findings to the faculty and the School Dean. The process of collecting and tabulating data is centrally coordinated and uniform across the institution. The faculty are motivated and clearly care deeply about the student's progress. They are involved in a wide range of research activities, with sufficient variability among the different faculty. The School's teaching and administrative staff provide appropriate teaching, support, and administrative services to the programme and the School, aligned with the goals and aspirations of the School as well as the Institution (TUC). Panel discussions with alumni and employers further confirmed the high level of preparation graduates of the programme receive. The School has established a Quality Assurance Policy, as well as a process for continuous monitoring which allows for continuous improvement.

Analysis: The process of monitoring and assessing the quality of the undergraduate program systematically is new not only to the School but also to the University. It is worth mentioning that the processes for collecting and tabulating teaching assessment data were only recently established and deployed. Therefore, the School is off to a good start. However, it became evident that the student body needed to be fully aware of the importance of the process. This was clearly reflected in the very low student participation in providing teaching assessment feedback.

Conclusions: The School has put in place all the components required for implementing a robust process for quality assurance. The School receives significant support from the institution (TUC), which is primarily responsible for supporting the data collection and analysis. The School has articulated clear objectives aligned with the long-term vision of the TUC.

Panel Judgement

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

Panel Recommendations

- The panel recommends that the School more actively pursues an information campaign so that students become aware of the quality assurance processes and their importance. Teaching faculty clearly articulate to students the utility of the internal assessment processes to increase effective and informative student engagement and participation.
- The panel recommends that the School formally and systematically engages all its stakeholders in the process of assessment data and continuous improvement.
- The panel recommends that the process of collecting feedback is conducted fully online (although it is recognized that these processes are currently under development by the University's central administration).

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

Findings: The mission of the School of Mineral Resources Engineering is to train engineers to perform a wide spectrum of scientific/technological activities, aiming at the exploration, exploitation, and utilization of mineral raw materials and energy resources in a sustainable way. The School offers a 5-year undergraduate program (UGP) that leads to the awarding of the diploma of Mineral Resources Engineer of the Technical University of Crete (Integrated Master) and is included in level 7 of the National and European Qualifications Framework (ΦΕΚ 3987/14-9-2018 τ.Β'). The program offers the following three areas of specialization after the 6th semester: a) Mining and Geotechnics b) Processing of industrial minerals and ores and c) Energy resources exploitation.

The Assembly of the School is responsible for drawing up the Undergraduate Study Program (UGP). The School appoints a Committee for Undergraduate Studies made up of members of the School's Assembly, which submits a relevant proposal to the Assembly. The SMRE designed its UGP following a coordinated process defined by the academic character and orientation of the UGP, its goals, academic subjects, structure and organization, the expected learning outcomes, and the intended professional qualifications according to the National Framework of Higher Education Qualifications. The process took into account the legislation concerning the professional rights of the Mineral Resources Engineer. In particular, the design of the UGP considered the experience and input of external agencies from the labour market for mineral

resources engineers, the international trends in the labour market for the profession, and related specializations with high demand.

The initial design of the undergraduate program (UGP) considered to a large degree, the curricula offered by the only similar school in Greece (NTUA) and well-known schools from abroad (Colorado School of Mines, West Virginia University, University of Utah, Montanuniversität Leoben) following the international trends in relation to the education and training of mineral resource engineers and other related specialties, changes in curricula and directions. The UGP encourages the active participation of students and pays attention to the smooth transition of students to all stages of their studies. The possibility of providing work experience opportunities to students was also considered by including in the program a mandatory industrial placement of at least one month during the summer.

The SMRE continuously updates its curriculum, following the state of the art in technology and sustainable development considering the sequence of human, mineral resources, environment, and sustainable economic development. Amendments to the Curriculum are discussed every May, and the decision of the School Assembly regarding the Curriculum appears in the Study Guide and web page. The planning and revision process takes into account: the skills of the students from the Secondary Education, study programs from other Universities in Greece and abroad, input from the students as well as graduates of other relevant Schools in Greece, data on the employment of former students of related schools, international trends in the scientific literature and the identification of emerging cutting-edge scientific areas, input of the experts in the subject, monitoring results of the applicable UGP and course evaluation results.

Analysis: The UGP followed the provisions of the European System of Transfer and Accumulation of Academic Credit Units. The number of weekly contact hours compares reasonably well with modern curricula. The number of offered courses is more than expected. The large number of courses may lead to fragmentation and multiple final examinations with no integration. There is a lack of multi-disciplinary projects that could serve this goal (e.g., a capstone design project, coordination of projects of different courses, etc.). The curriculum includes courses on IT and programming. The students use engineering and other software tools reasonably. The students have the option to graduate with some experiences regarding non-technical skills such as entrepreneurship, but more could be done on innovation and discovery, engineering ethics, an appreciation of what is important in engineering practice, the ability to make decisions in the face of uncertainty, and to work with open-ended problems.

Conclusions: The UGP program has been designed by applying appropriate national and international standards. The feasibility study for the construction of the undergraduate program addressed sufficiently the related objectives. It considered the needs for mineral resources, the protection of the environment, the circular economy and sustainable development, the prospects of Greece in exploration, development, and production of natural gas resources, and the overall prospect of employment of the graduates.

The curriculum compares well with appropriate, universally accepted standards for the specific area of study. The structure of the program is rational and clearly articulated. Nevertheless, there is still room for improvement. There is a procedure/regulation in place for periodic revisions of the program curriculum every May that considers the experience from the existing program as feedback for continuous improvement. The curriculum revision procedure involves

input from stakeholders mostly communicated through the industrial placement interaction, external experts, and students. The Student Guide appears to be complete and appropriate.

Panel Judgment

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

Panel Recommendations

To enhance adherence to this Principle, the Panel recommends the following:

- Revision of the undergraduate curriculum aimed at reducing the number of courses.
- Increase courses in English for attracting Erasmus students and exposing students to the international market language.
- Make all the technical courses uniform in ECTS (e.g., 5 ECTS) and not to exceed the range of 28-32 ECTS per semester with a total summing to 300 ECTS.
- Move the choice of area of specialization selection in the 9th semester.
- Introduce a final integrated (team) project (10-15 ECTS) in every direction in the 9th semester.
- Make formal the participation of students in the design and update of the curriculum process.
- Enhance the role of academic advisor making sure that the advisors are well prepared to answer student questions and are aware of the details of the program.
- Form an external advisory committee with the participation of members from important companies and organizations in the sector for continuous input for improvement of the UGP and closer and more effective connection with the Greek mineral resource exploitation industry.

Principle 3: Student- centred Learning, Teaching and Assessment

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

Student-centred learning and teaching plays an important role in stimulating students' motivation, self-reflection and engagement in the learning process. The above entail continuous consideration of the programme's delivery and the assessment of the related outcomes.

The student-centred learning and teaching process

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

In addition :

- *the academic staff are familiar with the existing examination system and methods and are supported in developing their own skills in this field;*
- *the assessment criteria and methods are published in advance;*
- *the assessment allows students to demonstrate the extent to which the intended learning outcomes have been achieved. Students are given feedback, which, if necessary is linked to advice on the learning process;*
- *student assessment is conducted by more than one examiner, where possible;*
- *the regulations for assessment take into account mitigating circumstances;*
- *assessment is consistent, fairly applied to all students and carried out in accordance with the stated procedures;*
- *a formal procedure for student appeals is in place.*

Study Programme Compliance

Findings: The undergraduate curriculum of the School of Mineral Resources Engineering aims to train engineers capable of covering a wide range of scientific and technological activities related to the exploration, exploitation, and processing of mineral resources, geotechnical projects, energy resources, and environmental geotechnology. During the first six semesters (3 years) students follow a common curriculum, while the courses in the 7th, 8th, and 9th semesters are organized in three areas of concentration: Mining and geotechnical works; Processing of industrial minerals and ores; and Exploitation of energy resources.

Incoming students are informed in various ways about everything concerning their studies and student life by the School. On the School's website, announcements are posted with necessary information material. Within the first weeks, an information day/welcoming meeting is held to

provide detailed information to the first-year students, with the participation of the Dean, the faculty members, and the Academic Advisor of the first year.

In addition, students are informed about all relevant issues related to coursework through the respective *e-class* platform, where all relevant information is posted (syllabus, timetables, teaching notes, suggested bibliography, possible alternative examination modes, and weighting percentages in the formation of the final grade and representative exercises and solutions).

Focusing on the central goal of effective student education, the School applies pedagogical methods that are differentiated according to the specific teaching needs of each course. The main concern is that the lectures of the courses are conducted with modern methods to stimulate the interest of the students, such as: computer presentations using multimedia (use of PowerPoint, presentation of videos & animations, etc.); Support of the learning process through the e-class tele-education platform (e.g. the posting of material of the presentations of the students on the e-class); e-lecture presentations (e.g. the posting of lecture presentations on the e-class, so that the student can be informed about the points of greatest interest in each course at a later stage, consolidate the knowledge provided by the lectures and assist in the preparation of assignments and solving the course exercises); Laboratory Practice (e.g. study and evaluation of experimental data through the use of specialized software programs, etc.); Participation in workshops, schools, etc.; Computer laboratories, equipped with appropriate software, in which solutions can be found for technical and scientific problems by the students; Educational exercises and visits in Greece and abroad (research institutes, academic institutions, industrial plants, quarries, mines, vertically integrated industrial plants, etc.); Preparation of individual/team projects. Often, the projects are presented by the students themselves and analysed during the course.

Information regarding examination and grading is mainly provided by sending corresponding e-announcements and e-messages on the main website of the School or the e-class or the electronic platform of the student directory in order to exclude the possibility that a student may not be the recipient of the information. Especially through the e-class platform, the control of the integrity of the procedure can be carried out by monitoring the actions of the students per course. Lecturers are constantly improving their teaching skills based on their experience and interaction with the academic community (international collaborations, research projects, mobility).

The evaluation of students is carried out consistently, without discrimination, at the end of the academic semester. To manage potential student complaints related to student-centred learning, teaching, and assessment, all faculty members observe weekly student office hours to address complaints, provide explanations, resolve problems, and generally provide proper guidance to students. In addition, there is an Academic Advisor for each year of study (from the 1st and 3rd years), while for the older years (4th and 5th) an Academic Advisor is appointed for each area of specialization.

Analysis: There were constructive in-person conversations with faculty, students, and other staff of the School and local officials over the 2-day local visit. There has been a low enrolment of students in this School in recent years, with only 23 active students in the current academic session. A critical concern relates to a newly created School (University of Western Macedonia in Kozani) that could potentially offer competitive advantages given its proximity to major

production sites and the local industry. Although the concept of the academic advisor is important, it also became evident that not all advisors are fully aware of procedures, often resulting in conflicting information communicated to students. The course evaluation questionnaires are submitted on paper, although an online system is about to be deployed by the University. Furthermore, student participation of students in course assessments is very low at 15% [2017-18], 13% [2018-19], and 14% [2020/2021].

The three areas of specialization offered by the School essentially differ only in 3-4 courses. Furthermore, student preparation for certain elective courses was deemed to be inadequate due to the coursework structure. The examination schedule should be posted much earlier than presently (two weeks according to our meeting with students) to allow students for adequate preparation and planning. A critical concern relates to poor class attendance, which is due to a multitude of factors. Finally, several pieces of laboratory equipment used in undergraduate education are over 30 years old, rendering their use problematic.

Conclusions: The School of Mineral Resources Engineering of the Technical University of Crete ensures its undergraduate programme is delivered in a way that encourages students to take an active role in creating the learning process.

Panel Judgement

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

Panel Recommendations

- The panel suggests that the faculty identifies more creative ways for increasing student participation and engagement in the classroom. These include but are not limited to activities such as encouraging students in various courses to develop their own investigation (project-learning), propose a solution, communicate their ideas to teachers and community members, and evaluate their own progress as they go. The instructors in turn help guide this process, but the content, timing, and motivation belong to the students themselves. These actions would help the School's efforts to increase class attendance.
- Robust assessment processes are critical for a rigorous evaluation of the level of student learning. The panel recommends that the faculty update their questionnaires to reflect more complex learning outcomes beyond whether students liked a course/instructor. Modes of assessment are evolving and should allow for the evaluation of a broader range of professional and subject-specific competencies, providing greater student choice and opportunities for students to showcase their talents.
- The panel suggests that the academic advisors familiarize themselves better with university policies, ensuring the accuracy of student advising and better monitoring of student performance and progress.

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 Schools and Institutions, in line with the principles of the Lisbon Recognition Convention.

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

Study Programme Compliance

Findings: The Technical University of Crete offers modern programmes of study, based on international standards. It applies periodic evaluation to keep abreast of international developments. It offers high quality theoretical and Practicum training, resulting in excellent employment prospects for its graduates. The External Evaluation Report of the Technical University of Crete, which was communicated on 30.3.2016 by the independent Authority for Quality Assurance and Accreditation in Higher Education (ADIP), ranks the Technical University of Crete in the highest possible rating, "Worthy of Merit". The highest possible ranking was also given to the institution in individual sections, such as the strategies of development, research, environmental protection, social policy and internationalization, the functioning of the services of the institution and the external evaluation process followed.

In the context of providing incentives and rewards aimed at better academic performance and its consistent policy of financial support for students who need it, the Technical University of Crete provides at undergraduate level and on the basis of academic performance and family status criteria of students following the indicative study programme (5 years):

- a. Commendation to the outstanding new entrants with the highest admission points per School (1 commendation per School).
- b. Awards for Excellence. 5 Excellence Awards are awarded per School (1 for each year of study), which include a commendation to students who meet the criteria established by the Senate.
- c. Euphemism Commendation. Awarded to students who graduate in the five years of the regular term of study including the September 5th year examination, with a grade of Distinction (8.5 or above).

It operates a Counselling & Psychological Support Office, individual counselling, group counselling and counselling with the help of the internet. In individual counselling, the Counselling & Psychological Support Office aims through personal meetings to help students to

understand and get to know themselves, to develop skills, to improve their interpersonal relationships and generally to strengthen their decision making on the issues that are of direct interest and concern to them.

In Group Counselling, the Counselling & Psychological Support Office aims, through the operation of groups and by utilizing the dynamics of each group, to help members express their concerns, share them with other members while receiving support, while developing social and interpersonal skills and a sense of how important it is to belong to an Academic community. Issues that groups may discuss may include:

- interpersonal and gender relations,
- communication with others,
- stress and ways of dealing with it and
- assertiveness, etc.

The School offers Erasmus+, the European Union's programme for Education, Training, Youth and Sport. Students, teaching and administrative staff of higher education institutions have the possibility to move with a grant from the European Union to another country, either European (Classic Mobility) or non-European, i.e. to a Partner Country (International Mobility), in order to study (Student Mobility for Studies), to work (Student Mobility for Practicum Training), to teach (Teacher Mobility), to train and develop professional qualifications and skills (Staff Mobility for Training).

The Summer Internship is compulsory, lasts for 1 month and takes place in companies (preferably) or organizations or institutions whose activities are related to the School's cognitive subjects.

In addition, the building facilities of the Faculty of Mineral Resources Engineering have been checked for accessibility for students, professors and staff of vulnerable/sensitive social groups.

The UGP uses the ECTS system, and the final degree is awarded within 10 semesters (5 years) upon completion of a total of 300 ECTS including a mandatory Diploma Thesis (30 ECTS).

The Diploma Supplement in both Greek and English is issued for all graduates.

The entire 10th semester of the UGP is dedicated to the completion of the Diploma Thesis and the Thesis Regulations Handbook is available online.

Analysis: There were constructive in-person conversations with faculty, students, and other staff of the School and local officials over the 2-day local visit. A significant drop in admissions has happened recently upon introduction of minimum entrance grade, seeing the intake reduced from 120 to ~40 of which only 23 finally registered in 2022. At the same time there is a large number of students registered in the “books”, who are in a stalemate with only 20-25% of the incoming cohort graduating in <5+2 years. This is cause for alarm that requires the School’s and TUC’s attention. Practicum Training (PA) is compulsory (6 ECTS) and very important and a consideration for lengthening its duration is advised. The PA is a complex process in its implementation which is handled by the PA manager of the faculty and the central PA Office and includes:

- Contacts with productive institutions to find suitable positions, informing students about available positions and selecting students.
- Coordination of the placement of students in internships (fees, insurance, etc.).
- Conducting, writing and presenting its relevant work to an open audience of students and faculty members on dates predetermined by the School (beginning of the academic year). The paper will be assessed by the faculty supervisor.

A satisfaction survey of the PA is conducted annually using questionnaires completed by both students who participated in the PA and by the managers of the companies and other institutions that employed the students. The results of the survey are processed, evaluated and presented by the faculty PA manager to the assembly in order to identify any weaknesses and improve the PA.

Student mobility is almost non-existent despite the School formally participating in Erasmus+ programme. In particular, students argued that there are no clearly identified course equivalencies with foreign Schools they partner with. In addition, the few Schools on the list have very expensive living costs which are prohibitive for them.

Conclusions: The School of Mineral Resources Engineering of the Technical University of Crete properly addresses all aspects of the programme (admission, progression, recognition and degree award).

Panel Judgement

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

Panel Recommendations

- The School should critically evaluate in cooperation with TUC's appropriate officials the recent drop in student intake on one hand and on the other reflect on how to increase graduation rates.
- The Diploma Supplement is not available on the School's website.
- The Practicum Training should have a longer duration and not 1 month.
- Strengthening and deepening the role of the School's Quality Assurance Unit (QAU) in order to improve the quality of both educational and research work. In addition, to emphasize the quality of the processes and services of the institution, with an antithesis mainly to the students, but also to the staff, faculty members, administrative staff, in order to create a high-quality academic community.
- Internships should be recognized as a valuable component of the UGP (University Graduation Program) rather than an impediment to student studies. It is imperative for the School to enhance its connections with the local industry, establish an expanded internship network, enhance the significance of internships within the UGP, and explore additional avenues for providing financial support to students during their internships, going beyond national resources and the Erasmus+ program.
- The School should embark on a comprehensive campaign to encourage student and staff mobility. Prioritizing the expansion of the Erasmus+ network through the establishment of new agreements must be an essential focus.

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 recognise the importance of teaching and research;*
- *offer opportunities and promote the professional development of the teaching staff;*
- *encourage scholarly activity to strengthen the link between education and research;*
- *encourage innovation in teaching methods and the use of new technologies;*
- *promote the increase of the volume and quality of the research output within the academic unit;*
- *follow quality assurance processes for all staff members (with respect to attendance requirements, performance, self-assessment, training etc.);*
- *develop policies to attract highly qualified academic staff.*

Study Programme Compliance

Findings: The School of Mineral Resources Engineering (SMRE) currently has 19 full-time academic staff (14 full professors, 1 Associate Professor and 4 Assistant Professors). In addition, the school has 18 Laboratory-Teaching Associates (EDIP) and 4 Lab Technical staff (ETEP). The EEAP had the opportunity to meet almost in its entirety the academic and lab teaching staff and be satisfied with the level of professionalism, academic competency, and devotion to their duties. The Unit follows, with reference to recruitment/hiring, the procedures established by Law. The members of the Panel from overseas universities note however, the process of promotion from one rank to the other with “open” calls that the Law requires to be unrealistic and rather a bureaucratic burden. Quality in promotion can be equally or better achieved with formation of a promotion committee with internal (TUC) and external members familiar with the particular field and the submission of external expert referee letters. Meanwhile, granting tenure only after 3 years (in essence 2 years when the candidate prepares for submission of their dossier) is too early. The international minimum of 6 years (based on the output of the first 5 years) should be considered. Exceptional candidates for retention purposes may be considered for earlier tenure consideration. We realize this to be across the Greek university system issue, but we contend that TUC and HAHE should actively raise it with the proper authorities.

Analysis: The high burden of bureaucracy by which Greek universities are obliged to operate seems to act as a deterrent in attracting qualified candidates from overseas universities. There are way too many committees and general assemblies -as a result of bad legislative (is this the case always?) framework- dealing from approval of a diploma thesis to acquisition/purchasing research supplies that clearly blocks full development of the dynamics of the School and its members. According to the report (at least since 2016) there were no academic staff recruited from overseas. Meanwhile the assistant professors we met are clearly of very high calibre that in some cases can be seen easily making careers abroad. This is very encouraging as they

represent the future and consideration should be given not to overload them with teaching and admin duties but only doing this gradually.

The average teaching load of 2 courses per term or 4 per academic year (2 obligatory for all and 2 for the area of specialization) is considered commensurate with overseas university practices although in case of highly performing researchers this may be reduced to 3. A problem we noticed is that several co-instructed courses are not transparently accounted for, leaving the impression of “double counting” and should be rectified with proper reporting. In another observation, at least in one case an assistant professor carried 6 courses that should be avoided although special circumstances (e.g., faculty retirement) may contribute to this.

Conclusions: The data from student evaluations of courses (given to us provide a positive picture with the overall average for most of them (40 courses) slightly above 4 out of 5, which is considered good. However, the evaluation is done (last day of lecture,) and the limited participation does not allow for a deeper appreciation of how effective teaching is. Several of the students we met had positive commentary on the access they have to their teachers which reflects teaching staff commitment. The integration of lab exercises in many courses is very positive and a must for an applied field as is the one covered by the School. The introduction of the *e-class* system by TUC and the wide adoption by teaching staff and students, it seems, is an excellent development that is expected to greatly improve the teacher-student interfacing. We learned that TUC created a support centre for teaching & learning that is hoped can be fully utilized by the School to improve teaching methods and effectiveness by its members. Some evidence of novelty in teaching (e.g., using web tools and videos) is introduced by new teaching staff that is very positive.

The 19 academic staff are involved in various research activities covering different areas of specialization, from satellite and advanced geophysics/remote sensing, geographical information systems, and geochemistry, to ground and rock mechanics, oil/energy resource engineering mineral processing and environmental technologies (water, tailings etc.). As such, the faculty members in their majority are experts in the subjects they teach. The cumulative statistics from the years 2016 to 2020 we received prior to our visit (B9-Anafores OPESP) were not very clear as in some years we have annual data and in other cumulative data. Notwithstanding this complexity the data over the period 2019-2020 indicate 63 journal (peer reviewed) articles for an average per professor equal to 3.3 or 3.1 for the period 2017-2022 according to data presented at the site visit. This is sound output if we take into account additional output in the form of conference papers and the various admin challenges impacting research activities (e.g., management of research funds, lab supplies, equipment maintenance etc.). Cumulative research funding data point to several (mostly small) grants obtained not only from European or National agencies but also from industry with the latter being a very good indicator of research relevancy. These activities help the connection of teaching to research as they involve student training (Diploma and postgraduate theses or lab exercises). Several of the faculty members have established international collaborations from collaborative research funding consortia to conference co-organizing or proceedings co-editing and short exchanges. In terms of sabbatical leaves however, there is no activity despite the availability of programs like Erasmus + mobility due to the “full year” teaching obligations (arising from the three specializations and the three examination periods!) but also the financial burden.

*Note: We beg in the future that data is processed to generate summary graphs and tables that clearly show trends making easier the extraction of conclusions as now the EEAP members are drowning into multitude year raw data tables!

Panel Judgment

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

Panel Recommendations

The panel recommends:

- There should be a separation of the process between hires for new (or vacated) positions and internal promotions. In the latter case no open call should be used but an internal school/university pathway that includes external referees.
- Granting tenure only after 3 years (in essence 2 years when a candidate prepares to submit their dossier) is too early. The international minimum of 6 years (based on the output of the first 5 years) should be considered.
- Stricter promotion criteria to the rank of full professor that includes international stature consideration are recommended as per well-established international practice.
- Present “over-bureaucratization” of academic/research operations constitutes a deterrent in attracting candidates from overseas or constitutes risk of retention for highly performing recruited faculty.
- The School, in collaboration with the Teaching & Learning Centre of TUC, should organize teaching seminars and semestrial or annual reviews to improve teaching effectiveness by all teaching staff.
- Student evaluation of courses and teaching innovation/effectiveness should be part of evaluating a staff member’s performance when considered for re-appointment and promotion.
- Course teaching load should be transparent so as to avoid the appearance of “double counting” in cases of co-instruction.
- Individual academic staff achievements like securing an important grant with international partners, election to an important international society executive position, and important awards for teaching or research should be internally and externally publicized and celebrated. This type of individual data granulation was absent from the documentation or presentations during the site visit.

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 School has adequate facilities (classrooms, relatively well-equipped research laboratories (12 in number), computer facilities, and study rooms) to support the learning and academic activities of the students. In addition, the School and TUC offer counselling and information services such as a career advising office, offices devoted to managing/promoting the practicum (ΠΡΑΚΤΙΚΗ ΑΣΚΗΣΗ), mobility programs (Erasmus) and psychological support. Other than the research laboratories where the different lab exercises are obligatory for the students is not clear to what extent the other offices are fully utilized. For example, there is almost nil student mobility (funding seems to be a big problem but also some issues like unclear course equivalency or rigidity of the program/curriculum). The Practicum office should intensify its efforts to promote the program to students and employers. The student-centred goal must remain a first priority as the attendance, drop-out and graduation rates are very poor. The latter is recognized as being heavily impacted by external to university factors (e.g., legislative framework), but the School and TUC must do their utmost to attract/retain/support their students. In this regard, the School should prioritize strengthening the role of Academic Advisor, which seems to be presently (as per student comments) limited to giving some stereotypic answers to students' inquiries. On the positive side, we note the efforts by the School to provide orientation to the new students and invite graduates from industry to explain their work and career paths. The hosting of invited seminars is another important activity. Also, launching *e-class* by TUC is a great addition to the available resources/services to the students and teaching staff. Finally, during the visit, we became aware of the TUC program of upgrading/maintaining its buildings including those of the School, according to modern sustainability standards. This is a very welcome development as some buildings are in poor condition.

Panel Judgment

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

Panel Recommendations

- Revisit and update teaching methods by introducing project-based learning opportunities and work closely with the Teaching and Learning Centre of TUC.
- Strengthen the operation of the Practicum office.
- Secure resources to ensure student mobility.
- Plan for critical lab facility upgrading as is the Scanning Electron Microscope Lab facility.

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

Findings: The basic service for the collection of information at TUC is the Quality Assurance Unit (MODIP) and its information system, with the main objective of evaluating the teaching, research and administrative work of the university. Information is collected and analysed and used to improve the overall academic work and ensure the quality of the services provided by each School through (a) the individual appraisal forms of the Faculty members and the teaching staff of the School, (b) the corresponding records of courses (c) the evaluation questionnaires of the courses by the students and (d) the questionnaires of the administrative services and infrastructure of the School and the University.

The SMRE collects, analyses and uses information, in order to effectively manage its UGP and related activities, in a unified, functional and directly accessible way. The School regularly records and collects information and statistics about its students and staff. Specifically, SMRE processes data annually that refer to the previous academic year and concern: a) student mobility and key performance indicators (number of active, Erasmus+ entrants, incoming students and corresponding modes of admission, outgoing students and corresponding reasons for leaving), b) student population profile (male/female ratio, additional data on existing knowledge), c) course of study and rates of early completion or dropping out of studies (examination success rates per course, courses with strong accumulation, number of graduates per year, percentage classification of scores, etc.) and the staff of the School (publications, conferences, reports, etc.) a.), the quality of teaching (statistical averages of questionnaires, etc.), d) availability of learning resources and student support, and e) careers of graduates.

Analysis: The individual appraisal forms of the teaching staff include information related to the research output, teaching and administrative work. The research data includes publications, cross-references, patents, participation in committees and social actions, as well as participation in research funding projects. For the research project, additional information is drawn from relevant online databases (ISI Web of Science, Scopus, Google Scholar). The MODIP information system registers, for each member of the School academic staff, publications, cross-references, conference proceedings, research and development projects and any other research activity (organization of conferences, participation in editorial boards of scientific journals, etc.). With the assistance of OMEA, the Dean and the School monitor and evaluate the results of the research efforts of its members.

Each course of the SMRE uses the *e-class* electronic distance learning platform (<https://www.eclass.tuc.gr/>), where the basic and additional educational material of the course as well as any other useful information are posted. The e-class platform is used by all teachers, who post exercises, course material and lecture slides in the documents of each course. Also, notices are posted about the progress of the course, for cancellations-replacements of courses, lectures, etc. Students can have interaction as they can deliver their assignments online or follow the progress or be informed about the deadline for each exercise.

The course evaluation questionnaires are completed, currently manually, anonymously by the students and mainly concern the quality and means of teaching, the structure and content of the studies, the teacher, and the infrastructure. By submitting the questionnaires, the students' answers are processed electronically, and the anonymized results of their analysis are available to the course instructors. The School's Internal Assessment Team (OMEA) has access to the evaluation results of all courses, as well as aggregated results. Each teacher must take into account the results and design a plan of corrective changes in the educational process that follows.

The monitoring of the professional development of the graduates of the School is carried out at the level of the Institution by the Liaison & Career Office (<https://www.career.tuc.gr/el/archi>), whose main objective is the support of the students/graduates for their smooth integration into the labour market and for the development of a successful career.

The Secretariat of the School has an information system, which allows, among other things, the electronic submission of course declarations by students and the electronic registration of grades. From the information system, personalized information and conclusions can be extracted regarding the course of study of students, as well as aggregated data regarding the percentage of students who complete their studies on time, the average time to complete the studies, the average students' final score and the percentage of students who drop out.

Conclusions: The TUC and SMRE established procedures for the collection of data regarding staff performance, student body, teaching methods, and student progression. It maintains a mechanism to record the employability and career paths of graduates. There are efficient information systems and methods for the collection of data. SMRE analyse and evaluate data related to the availability and accessibility of resources (equipment, social services, IT facilities). The system is organized in a way that personal data are protected, minimizing any risk of bias, intervention, and discrimination. The information systems which record and collect data of the Schools and of other services (library, administrative services), supply and complete with data

the evaluation tables of the Schools according to the standards of the National Authority of Higher Education (ETHAAE). The School, based on the results of the analyses, makes every possible effort to address the identified problems, with the aim of improving the quality of the provided education and services. A defining part of the process is the reforming of curricula and course content.

Panel Judgement

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

Panel Recommendations

The panel recommends that the School shall conduct regular student and staff satisfaction surveys and make a provision for the information obtained from the satisfaction surveys to be systematically analysed, appropriately communicated, and used towards improvement to comply with the expected performance and progression.

Principle 8: Public Information

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

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

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

Study Programme Compliance

Findings: The School has maintained an active website and developed a completely new website <https://www.mred.tuc.gr/en/home> (in Greek and English) which is regularly updated with news and activities. The website includes information on the vision and mission, the strategic planning and the quality policy of the Institution, basic information about other Schools with hyperlinks to their individual websites, general information about undergraduate and postgraduate studies, information on the Library's services, Internship, Erasmus+ Mobility Programs, the EURECA-PRO Program, the psychological support office, the academic calendar, information on the services provided to students (School of Telecommunications, Networks and Computing Infrastructure, School of Public and International Relations, etc.), research indicators, social welfare benefits and the possibilities of entertainment and participation in cultural and sports activities and Associations.

Analysis: Nevertheless, there is room for improvement in the appearance of information, e.g., include near the picture of the academic staff a short bio of a standard form.

Conclusions: The School has an extensive network of external stakeholders; some are actively involved in its activities. All the stakeholders met by the Panel are eager to get engaged and help the School to achieve its goals.

Panel Judgement

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

Panel Recommendations

The panel recommends:

- All academic members should have up to date info on their research lab activities including providing links to their publications via personal web pages or other platforms like Google Scholar.
- The School creates and maintains active YouTube, Facebook, LinkedIn accounts.

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

Findings: Re-evaluation and updating of the Curriculum is examined by the UG Studies Committee. Its suggestions are discussed every May in the School Assembly, and the final decision regarding the curriculum appears in the Study Guide. The revision and amendment process takes into account: the level of education and skills of the enrolled students from the Secondary Education, curricula from other Greek Universities and abroad, input from the data on the employment of former students of related Schools, international trends in the scientific literature and the identification of emerging cutting-edge scientific areas, input of experts in the subject, monitoring results of the applicable UGP and course evaluation results by students. The re-evaluation process considers the feedback of the reports from the industrial placement. It appears that the student participation, other than the course evaluations, is currently at the level of the School assembly decision. The course evaluation reports by the students are currently completed manually and then are processed electronically. However, the school is in the process of developing the tools for the student evaluation reports to be done electronically.

Analysis of judgment: The Committee found positive elements in the re-evaluation and updating of the curriculum process. The process can be improved substantially with the participation of the students in the whole process, including representation on the OMEA. The input from industrial partners through personal communications and during the industrial placement of students, is particularly important to the aim of the continuous input for improvement of the UGP. There should be an action plan following each annual curriculum evaluation aiming at enhancing learning outcomes and effectiveness in terms of curriculum content/structure, grading procedures and teaching methods so student attendance, retention and graduation rates are improved. The establishment of an Advisory body of external experts in the field would

facilitate the input process and it would also offer a first-class opportunity to SMRE and its students to build effective connections with the Greek mineral resource exploitation industry.

Conclusions: The self-assessment procedure of the programme is scheduled to take place annually. There is provision for the outcomes of the self-assessment to be recorded and submitted to the OMEA of the School and MODIP of the TUC. The findings of the self-assessment are shared within the School. The self-assessment results are documented and communicated but their translation to action plans requires further strengthening.

The overall culture of the University and the Schools is in the right direction regarding the internal evaluation of the whole School and the study programme. The internal evaluation is promoted by the School personnel, who positively included comments for further improvements. The positive attitude of the teaching staff can lead to a very competitive study program.

Panel Judgment

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

Panel Recommendations

- Include the student participation in the design and update of the curriculum process from the early beginning in a formal, documented way.
- Form an Advisory body of experts from the relevant industries to review and make suggestions on the improvement of the curriculum.
- Student course evaluations to be done electronically in a systematic way and defined time period. Consider ways to increase the number of filled evaluations.

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

Findings: This is the first accreditation review for the School of Mineral Resources Engineering following the transition from the old evaluation program (ADIP). Therefore, the program did not have the opportunity to respond to any previous reviews focusing on accreditation. The only previous external evaluation that broadly examined the Mineral Resources Engineering program of the TUC took place in September 2011. Since then, several of the recommendations of that external evaluation panel were implemented, such as: (somewhat) reducing the number of electives, increasing exposure to basic sciences (geology and chemistry), implementing teaching evaluation assessments, and streamlining pre-requisite requirements. This is a commendable outcome showing the School's team spirit and willingness to adhere to a policy of continuous quality improvement and the aspiration to reach excellence in its educational, research, and service activities. Meanwhile, the proposed increase of the time spent on the common core from 6 to 8 semesters was not adopted-an issue that the present panel recommends revisiting (refer to Principle 2). From our discussions with the faculty, it became evident that all teaching staff are in agreement that the School should work towards the direction of a continuous improvement of their curriculum. Nevertheless, it must be noted that the School needs to engage its students and stakeholders in a more systematic way. Their alumni, social partners, and employers expressed great enthusiasm for the program and willingness to provide extensive support.

Analysis: As mentioned above, given that this is the first accreditation, the panel does not have much to comment on specifics in terms of actions taken by the School beyond establishing processes. However, it should be pointed out that the School demonstrated that they have the mechanisms in place to develop a consistent workflow for the program assessment and have illustrated how the feedback is used to conduct changes that aim at improving the educational outcomes. The stakeholder engagement is, at this point, serendipitous and mostly based on ad hoc interactions (primarily through Diploma thesis or other research interactions).

Conclusions: In summary, a new culture has taken root in the School that underlies the regular evaluation of the effectiveness of the procedures and actions taken with respect to the quality of the curriculum by the Curriculum Committee, the Internal Evaluation Team OMEA, and the General Assembly of the School. The panel is hopeful that the School will continue its support of the processes that it has initiated and apply the internal assessment processes in a regular and consistent way.

Panel Judgment

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

Panel Recommendations

The panel recommends:

- The panel strongly encourages soliciting stakeholder feedback independent of any formal HAHE reviews. It is imperative that a culture of actively soliciting input is developed.
- The panel recommends that the program establishes formal ways to engage its alumni, social partners, and employers in the process of evaluating, assessing, and updating its curriculum and student experience.
- The panel recommends that the School adheres consistently and rigorously to the presented internal process of program quality assessment on an annual basis. The School should also establish criteria for assessing the impact of any follow-up actions.

PART C: CONCLUSIONS

I. Features of Good Practice

- The School has implemented mechanisms for monitoring and ensuring the quality of work and services.
- The School is well-staffed with academic personnel.
- The faculty is dedicated to its mission.
- The active research engagement of staff in modern practice in their areas of expertise was obvious.
- The teaching facilities, including the laboratories, are well-equipped and organized, but certain instrumentation, e.g., electron microscope, needs to be replaced with a new one.
- The practical training connects the students with industry and the real working world.
- Undergraduate student involvement in research projects through their diploma thesis is a positive measure with obvious advantages.
- The external stakeholders were very supportive, as evident from our online meeting.

II. Areas of Weakness

- The School needs to engage with the local/national communities more and promote its capabilities and work.
- Erasmus should be promoted more, and the academic unit should make some changes in the courses when attended by foreign students (For example, some courses in the English language).
- Low student enrolment and retention is a major challenge to long-term sustainability.
- Appropriate allocation of teaching duties should consider a contribution to research/research supervision and administration duties.
- The Diploma Thesis should be discussed with students earlier, and titles should be agreed upon before the final semester (10th). This will give students more time to prepare their work without being delayed.
- Over-bureaucratization of academic operations mandated by the current legislative framework serves as a deterrent in the full development of its researcher professors and recruiting candidates from overseas.

III. Recommendations for Follow-up Actions

- Establish an advisory board composed of alumni, employers, and social partners and develop robust, direct, and consistent communication channels to receive constant and timely feedback.

- Revise the undergraduate curriculum aiming at reducing the number of courses and providing for student input via committee participation.
- Increase the number of common semesters to 8 and have semester nine devoted to specialization with adding a capstone design course on top of the three elective courses.
- Ensure and plan for a sustainable School - Increase student enrolment, attendance, retention, and timely graduation.

Additional recommendations are mentioned above in each Principle, which we request that the management of the TUC and staff of the School of Mineral Resources Engineering consider following the submission of the report.

IV. Summary & Overall Assessment

The Principles where full compliance has been achieved are: **1, 3, 5, 7, and 8.**

The Principles where substantial compliance has been achieved are: **2, 4, 6, 9, and 10.**

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

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

Overall Judgment	
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. Prof. Ioannis P. Androulakis (Chair)**
Rutgers, The State University of New Jersey, USA

- 2. Prof. George P. Demopoulos**
McGill University, Montreal, CA

- 3. Mr. Georgios Kornelakis**
Technical Chamber of Greece, GR

- 4. Prof. Panos Papanastasiou**
University of Cyprus, Nicosia, CY

- 5. Mr. Michail Voskakis**
Hellenic Mediterranean University, GR