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Accreditation Report for the Postgraduate Study Programme of:

Catalysis and its Applications in the Industry (fmr. Catalysis and its Applications)

Department: Chemistry

Institution: National and Kapodistrian University of Athens

Date: 30 November 2023







Report of the Panel appointed by the HAHE to undertake the review of the Postgraduate Study Programme of Catalysis and its Applications in the Industry (ex. Catalysis and its Applications) of the National and Kapodistrian University of Athens for the purposes of granting accreditation.

TABLE OF CONTENTS

Part A: Background and Context of the Review	4
I. The External Evaluation & Accreditation Panel	4
II. Review Procedure and Documentation	5
III. Postgraduate Study Programme Profile	7
Part B: Compliance with the Principles	8
PRINCIPLE 1: QUALITY ASSURANCE POLICY AND QUALITY GOAL SETTING FOR THE POSTGRADU	
PROGRAMMES OF THE INSTITUTION AND THE ACADEMIC UNIT	8
PRINCIPLE 2: DESIGN AND APPROVAL OF POSTGRADUATE STUDY PROGRAMMES	11
PRINCIPLE 3: STUDENT-CENTRED LEARNING, TEACHING, AND ASSESSMENT	14
PRINCIPLE 4: STUDENT ADMISSION, PROGRESSION, RECOGNITION OF POSTGRADUATE STU	DIES, AND
CERTIFICATION	16
PRINCIPLE 5: TEACHING STAFF OF POSTGRADUATE STUDY PROGRAMMES	20
PRINCIPLE 6: LEARNING RESOURCES AND STUDENT SUPPORT	22
PRINCIPLE 7: Information Management	24
PRINCIPLE 8: Public Information Concerning The Postgraduate Study Programmes	26
PRINCIPLE 9: On-GOING MONITORING AND PERIODIC INTERNAL EVALUATION OF POSTGRADU	ATE STUDY
PROGRAMMES	28
PRINCIPLE 10: REGULAR EXTERNAL EVALUATION OF POSTGRADUATE STUDY PROGRAMMES	30
Part C: Conclusions	32
I. Features of Good Practice	32
II. Areas of Weakness	32
III. Recommendations for Follow-up Actions	32
IV. Summary & Overall Assessment	34

PART A: BACKGROUND AND CONTEXT OF THE REVIEW

I. The External Evaluation & Accreditation Panel

The Panel responsible for the Accreditation Review of the postgraduate study programme of Catalysis and its Applications in the Industry (ex. Catalysis and its Applications) of the National and Kapodistrian University of Athens comprised the following five (5) members, drawn from the HAHE Register, in accordance with Laws 4009/2011 & 4653/2020:

1. Dimakis Nikolaos (Nicholas) (Chair)

Department of Physics and Astronomy, College of Sciences, University of Texas Rio Grande Valley (UTRGV)

2. Koutsogianni Zoi-Lina

Aristotle University of Thessaloniki

3. Pavlostathis Spyros

School of Civil and Environmental Engineering, Georgia Institute of Technology

4. Soultanas Panagiotis

University of Nottingham

5. Xantheas Sotiris

Pacific Northwest National Laboratory U.S. Department of Energy

II. Review Procedure and Documentation

The Hellenic Authority for Higher Education (HAHE) formed an external evaluation assessment panel (EEAP) of experts to assess the compliance of the postgraduate study programme (PSP) "Catalysis and its Applications in the Industry" of the National and Kapodistrian University of Athens (NKUA). The EEAP was tasked to draft an accreditation report in accordance with the HAHE quality assurance requirements (laws 4009/2011 & 4653/2020). The PSP assessment was conducted through document reviews and online interviews with the academic staff, the PSP students and its graduates, as well as with social partners. The method used was an evidence-based process centered on the sampling of the PSP's activities. It was aimed at evaluating the fulfilment of the HAHE's requirements of the relevant PSP quality assurance standards and commenting on its compliance, effectiveness, and applicability. The information provided by the PSP was assumed to be factually correct. The entire evaluation and accreditation was carried out remotely.

First of all, in order to facilitate acquaintance and establish a working approach for accreditation procedures, the EEAP met online on Monday 20th of November 2023 from 14:00-15:00 (Eastern European time-EET). The EEAP review of the PSP started officially via Webex at 15:00 EET. During the meeting held from 15:00 EET to 16:00 EET, the Director of the PSP Prof. G. Papadogiannakis, the Steering Committee (Prof. M. Pitsikalis and Assoc. Prof. C. Kokotos), the Department Internal Evaluation Group (OMEA) member (Prof. P. Paraskevopoulou), and the University Quality Assurance Unit (MODIP) members and staff were present in this meeting. The director of the PSP Prof. G. Papadogianakis provided an overview of the PSP, covering the historical background, academic profile, admission procedure, student's opportunities, current status, as well as highlighting the strengths and potential of concern. The EEAP watched an online video (16:00-16:30 (https://drive.google.com/file/d/1MoSfPXGCSfrCNNZ YIWwRPhrQuONtgVc/view?usp=sharin g), where the facilities were presented. Subsequently, the EEAP met and discussed with administrative staff members (G. Satratzemi) and teaching staff members issues related to the PSP's infrastructure and students' access to the various facilities. At the end of the day, the EEAP met privately until 16:30 EET, to discuss the impressions of the first day and made preparations for the second day of the online review.

On November 22, 2023, from 15:00 to 15:45 EET, the EEAP met with the teaching staff of the PSP, Prof. P. Kyritsis, Assoc. Prof. V. Magrioti, Assis. Prof. A. Papageorgiou, Assis. Prof. N. Psaroudakis, and retired Prof. G. Kokotos, to discuss the professional development opportunities, mobility, and the teaching methods. At 16:00 EET, the EEAP met with the only one current PSP student to discuss her satisfaction and her study experience so far. At 17:30 EET, the EEAP met with the PSP graduates, Nikolaos Kokkinos, Eleni Patanou, Ioannis Stamatopoulos, Eleni Charalampous, Eirini Efstathiou, Kalliopi Krommyda, Panagiotis Stathis,

and Ioanna Thanou, to discuss about their experience and their career paths. At 18:15 EET, the EEAP met and discussed with employers and social partners of the PSP (hereafter named as external stakeholders), Klaus Köhler, Aggelos Ginis, and Harry Perdikis. Finally, after debriefing among the EEAP members in private at 19:00 EET, the EEAP had a closure meeting at 19:30 EET with, Prof. G. Papadogiannakis, the OMEA (Prof. P. Paraskevopoulou), the Steering Committee (Assoc. Prof. C. Kokotos and Assoc. Prof. G. Vougioukalakis) and the MODIP (T. Chatzitheodorou), where they discussed the PSP key findings.

During the following days (23-26 November 2023), the EEAP received additional requested information and documents from Prof. G. Papadogiannakis and evaluated the content for the completion of the draft of the accreditation report.

III. Postgraduate Study Programme Profile

The PSP "Catalysis and its Applications in Industry" is hosted and offered by the NKUA Department of Chemistry. The PSP was initially established in 2004 as "Catalysis and its Applications" in the Department of Chemistry (Φ EK 1797/6-12-2004 τ .B'), whereas in 2016 it was reformed (Φ EK 2917/13-9-2016 τ . B'). The current PSP was re-established in 2018 and renamed to "Catalysis and its Applications in Industry" (Φ EK 2762/11-7-2018 τ .B') and operates since then.

The objectives of the PSP are the promotion of scientific knowledge and the application of new knowledge and technology and the specialization of scientists in the field of catalysis. Teaching in the PSP is carried out by faculty of the NKUA Department of Chemistry. The instruction is inperson. The maximum number of admitted students per academic year is set to 10. Holders of a degree in Chemistry, Materials Science, Chemical Engineering, and from other related fields from Greek universities and from abroad, which are recognized by the DOATAP (the Greek Accreditation Centre for foreign university degrees), are eligible to apply to the program. The duration of the PSP is three (3) academic semesters. To graduate, the student must have successfully completed a total of 90 European Credit Transfer And Accumulation System (ECTS) credits (60 ECTS for coursework and laboratory exercises and 30 ECTS for the preparation and successful completion of a postgraduate Thesis). A total of €2,100 in tuition fees for the entire program is paid in three instalments. Students who meet the economic and social criteria and upon conditions of excellence during the first cycle of studies, in accordance with the current legislation, are exempted from tuition fees. The number of exempted students cannot exceed 30% of the total number of students admitted to the PSP per academic year.

PART B: COMPLIANCE WITH THE PRINCIPLES

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

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

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

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

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

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

Documentation

- Quality Assurance Policy of the PSP
- Quality goal setting of the PSP

Study Programme Compliance

I. Findings

The institution has developed and implemented its quality assurance policy as part of its broader strategy (https://en.uoa.gr/about_us/mission_policies_and_publications/quality_assuranc e_policy/). The Department of Chemistry, in collaboration with the MODIP and the OMEA, has harmonized the quality assurance policy of the PSP Catalysis and its Applications in Industry with that of the university, accompanied by annual

quality assurance targets for the continuous development and improvement of the PSP, as well as that of the academic unit and other educational programmes.

The PSP quality assurance policy is publicly accessible from its website (http://catalysis.chem.uoa.gr/politiki-poiothtas.html) and includes adequate reference to the PSP delivery, including commitments to satisfy requirements and the strive for continuous improvement. The quality assurance policy is sufficiently communicated to all parties involved. Goals are monitored, updated, and communicated according to the quality assurance policy, implemented by the institution and the PSP. The quality assurance system is reviewed on an annual basis by the OMEA and results communicated to the MODIP, which issues an annual report. In addition to OMEA, a departmental Coordinating/Steering Committee further aids in the overall quality assurance of the PSP.

The processes and procedures used for the monitoring and continuous improvement of the PSP quality are as follows: a) The strict implementation of the PSP Policy for quality assurance; b) The optimal disposition and management of the PSP resources, including those resulting from tuition fees; c) The establishment of quality assurance objectives of the PSP on an annual basis; d) The periodic internal evaluation and monitoring of the PSP on an annual basis; e) The collection of quality data, quantitation, analysis, and improvement of the PSP;

f) The disclosure and publication of all information related to the PSP made publicly accessible; g) The periodic external evaluation and accreditation process following the established procedures by HAHE.

The quality and effectiveness of teaching is closely monitored through the course/instructor evaluation by the students, with data collected by the OMEA and transferred to MODIP.

II. Analysis

The structure and organization of the PSP is well thought out and in line with the overall goal of the programme. The advanced material covered along with the study of new techniques in the area of Catalysis result in learning outcomes and qualifications of the postgraduate students consistent with Level 7 of the European and National Qualifications Framework for Higher Education. Teaching methods, learning outcomes, and student satisfaction are all explained in the PSP Study Guide. The PSP students have access to excellent support services at both the department and university level.

The PSP has set specific and measurable goals regarding the postgraduate programme. The targets are also paired with suitable key performance indicators (KPIs). According to the 2023 quality targets report, overall the PSP is at a satisfactory point in terms of achieving several set targets. However, accurate evaluation of annual targets, especially those related to the number of postgraduate students, is not possible due to the very low enrolment (3, 4, and 2 registered students in 2018, 2019, and 2020, respectively; 0, 0, and 1 registered

students in 2021, 2022, and 2023, respectively) compared to the maximum number of ten (10) admitted and enrolled students per academic year, as set by the PSP. Low student enrolment raises questions relative to the long-term sustainability of the otherwise excellent postgraduate programme. The PSP faculty are aware of this situation and discussed with the EEAP a number of new initiatives towards achieving a higher student enrolment.

III. Conclusions

Overall, this is a well-organized PSP focusing on the quality of the offered knowledge and skills. The PSP quality assurance policy includes a commitment for its implementation and continuous improvement. The metrics established by the PSP are adequate in tracking and documenting the quality of the programme. However, accurate evaluation of annual set targets is not possible due to the very low student enrolment. The current low student enrolment is an urgent issue that needs to be addressed in order to ensure the long-term sustainability of the PSP.

Panel Judgement

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

- The PSP must increase student enrolment to ensure its long-term sustainability.
- Major improvements made as a result of course/instructor evaluations should be documented, communicated to all involved, and published on the PSP website.
- The set values of several annual targets should be reassessed.
- Interactions with alumni upon their graduation should be exploited as a potential means of informing the decision-making process regarding future directions of the programme.
- Establishment of a formal External Advisory Board should be considered, which will guide the continuous review, revision, and further development of the curriculum.

PRINCIPLE 2: DESIGN AND APPROVAL OF POSTGRADUATE STUDY PROGRAMMES

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

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

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

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

In addition, the design of PSP must consider:

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

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

Documentation

- Senate decision for the establishment of the PSP
- PSP curriculum structure: courses, course categories, ECTS awarded, expected learning outcomes according to the EQF, internship, mobility opportunities
- Labour market data regarding the employment of graduates, international experience in a relevant scientific field
- PSP Student Guide
- Course and thesis outlines
- Teaching staff (name list including of areas of specialisation, its relation to the courses taught, employment relationship, and teaching assignment in hours as well as other teaching commitments in hours)

Study Programme Compliance

I. Findings

The PSP "Catalysis and its Applications in Industry" is well-designed and covers a broad selection of topics. The study programme has been designed based on international standards. It is systematically reviewed based mainly on students' questionnaires and teaching staff initiatives. Course revisions are proposed to the Study Programme Committee, which then brings them for approval to the General Faculty Assembly. Occasionally, current developments, advancements in the field, and new techniques are considered, resulting in new and revised courses. The programme follows the ECTS: It consists of three semesters, each amounting to 30 ECTS (90 ECTS in total). The last semester is dedicated to postgraduate Thesis work. The course workload, in general, does not seem to be heavy, both for students and the teaching staff. Students' participation in internship training is possible, but not required.

A detailed description of the courses offered is provided on the PSP website. Information is revised and updated regularly. There is a large number of elective courses to better match the professional interests of students, both those who seek employment upon graduation and those who continue on with doctoral studies. Lectures are given in-person, although the PSP has the capability for remote, synchronous teaching. There is minimum overlapping with the content of similar undergraduate courses. Thus, the students' needs to upgrade their knowledge are fully satisfied. Overall, the quality of the programme at the postgraduate level is very high. Students' mobility to European programmes through Erasmus+ and/or CIVIS is encouraged and students participate in summer short courses.

The PSP prepares graduates for careers in both the private and public sector of the economy, such as in chemical and pharmaceutical industry, quality control laboratories, health services, research and development (R&D) departments, public bodies, as well as in research centers. In addition, a number of graduates continue with doctoral studies.

The alumni and stakeholders interviewed by the EEAP expressed a very positive opinion of the programme and the technical skills of the programme's graduates. However, the EEAP found no evidence of advice by external stakeholders used in the strategic development of the programme, potential curriculum enhancements, research needs, and alternative sources of funding.

II. Analysis

The study programme results in learning outcomes and qualifications of the postgraduate students and is consistent with Level 7 of the European and National Qualifications Framework for Higher Education. The teaching staff is dedicated to the mission of the programme and is experienced in running it. Teaching is linked to the extensive research activities of the faculty, which informs students relative to contemporary topics, as well as to new developments and techniques. There is

no regular, established procedure for systematic review and revision of the programme. In particular, there is no evidence of student participation in the curriculum development and revision. The PSP interactions with external partners are good, but most of them are not systematic or formalized. In spite of the high quality of this PSP and its excellent record of very successful graduates in the past, student enrolment in the last four academic years was and remains very low. The inability to increase the number of enrolled students raises questions for the long-term sustainability of the otherwise excellent programme. The PSP faculty are aware of this situation and discussed with the EEAP a number of new initiatives towards achieving a higher student enrolment.

III. Conclusions

Overall, the EEAP finds that the programme is not fully compliant with Principle 2, mainly for recently having a very low student enrolment, and for not having established a formal process for the periodic review and revision of the curriculum involving postgraduate students, recent graduates, as well as external partners and stakeholders.

Panel Judgement

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

- Procedures to introduce new courses should be clearly formulated.
- New methods of student engagement should be explored, such as tutorials, new pedagogical methods of learning, mid-term examinations, quizzes, etc.
- Establish a formal process for the active participation of students in the curriculum development of the programme.
- A dedicated alumni portal may be developed to promote post-graduation interactions. This community could facilitate important networking interactions among graduates.
- Engage alumni and external programme partners in the strategic development, revision, and enhancement of the programme.

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

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

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

The student-centred learning and teaching process

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

In addition

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

Documentation

- Sample of a fully completed questionnaire for the evaluation of the PSP by the students
- Regulations for dealing with students' complaints and appeals
- Regulation for the function of academic advisor
- Reference to the teaching modes and assessment methods

Study Programme Compliance

I. Findings

The PSP has a duration of three-academic semesters, requiring the successful completion of six (6) mixed lecture/laboratory courses over a two-semester period, and a postgraduate Thesis in either Greek or English during the third semester for a total of 90 ECTS units. Currently the PSP has a very low student enrolment, which

makes the statistics of the various performance indices provided by the students (feedback, mobility, professional career, etc.) meaningless. It was not immediately clear whether the change in duration from 4 to 3 semesters is the cause of the very low student enrolment.

II. Analysis

The students and graduates receive high quality education from accomplished teaching staff and in addition hands-on experience during their 3rd semester. The statistics related to student feedback and indices are meaningless due to the very low student enrolment (<4 from 2018-2021, zero in 2021-2022 and 2022-2023 and just 1 in 2023-2024).

III. Conclusions

The curriculum offered by the PSP adheres with the standards set forth by HAHE. However, the lack of enrolment is a point of great concern for the future of the PSP.

Panel Judgement

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

- Change the title of the PSP to incorporate domains such as green energy and/or sustainability. This will require changing the courses offered and adding / replacing teaching staff as appropriate.
- The PSP should demonstrate an increase in the student enrolment in the next 5 years.
- Seek the input of industry in their participation in joint projects for the postgraduate Thesis and summer internships of the students during the summer of the first year.

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

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

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

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

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

Documentation

- Internal regulation for the operation of the Postgraduate Study Programme
- Research Ethics Regulation
- Regulation of studies, internship, mobility, and student assignments
- Degree certificate template

Study Programme Compliance

I. Findings

The PSP admits up to 10 students every academic year. Since 2018, a total of 10 students were admitted, which corresponds to an average of approximately 1.7 students per academic year. In the last three academic years, the PSP recruitment has been poor. No students were enrolled in the 2021-22 and 2022-23 academic years, whilst only one student is enrolled in the current academic year. This PSP has evolved over the years (since 2004) to its current form with its reformation in 2018 through the relevant law (ΦEK 2762/11-7-2018).

The admission criteria cover a broad spectrum of factors, including the undergraduate degree grade, the final undergraduate research project, the average grade for the three most relevant undergraduate courses, the knowledge of the English language, any published research articles, letters of recommendations, possible practical/professional experience, an admission interview and for international students, the knowledge of the Greek language. Annually in June, the advert for admissions is uploaded on the PSP's and the institute's (NKUA) website. No information was provided whether the PSP is advertised in other websites but from the discussion with the current student it appeared that she saw the initial PSP call on www.eduguide.gr. Student applications for admission to this PSP are submitted electronically by September at https://eprotocol.uoa.gr. Fees of €700 per semester are imposed but scholarships can be given to outstanding students based upon their academic performance and economic and social criteria.

The current student was welcomed and given relevant orientation information during an initial meeting with the PSP coordinator. All relevant information is also available in the Study Guide, which is uploaded on the PSP web site (http://catalysis.chem.uoa.gr/). All announcements and subsequent information uploads are forwarded to the PSP students through their personal emails. The research advisor for each student is appointed early on. All PSP students benefit from the wider facilities, tools, and resources of the NKUA.

The study programme is delivered in three semesters, each contributing 30 ECTS, amounting to a total of 90 ECTS. The first semester includes 3 compulsory courses. The second semester includes six optional courses from which each student must choose three courses to make up the necessary 30 ECTS for progression to the final third semester, which is dedicated entirely to the postgraduate Thesis.

Students are assessed in their courses through a final exam that may include multiple choice questions, questions challenging the critical and problem-solving abilities of students, depending on the assessment specifications set by the course coordinator. Lectures are in person but can also be remote.

The PSP cooperates with foreign institutions within the framework of the Erasmus+ exchange programme and CIVIS (Europe's Civic University Alliance). Internships are not offered in this PSP and direct links to industry are limited to non-existent. The NKUA Department of Chemistry uses Turnitin to guard against plagiarism and cases of academic misconduct including copy/paste and internet misuse. There is an intention from the department to also guard against the misuse of AI but no clear guidance was apparent.

The postgraduate Thesis contributes a substantial percent of the overall degree grade (i.e., 1/3). The Thesis can be either in Greek or English, followed by a public defence. The Diploma Supplement is issued in both Greek and English, free of charge to all graduates of the PSP. This provides detailed information on the identity of the diploma holder, the actual qualification, the level of the qualification, the contents of the PSP, and the academic results gained by the holder.

II. Analysis

The PSP provides the students with a strong theoretical and practical background in the field of Catalysis and its applications in industry. However, the major problem of this PSP is the very low number of students that enrol, with only one student in the current academic year and no students in the two previous academic years. Student recruitment needs to increase to make this PSP financially viable and sustainable.

From our discussions with the current student and past graduates from this PSP, it emerged that the introduction of industrial placements/internships may be of interest to many students.

There needs to be clear guidance to the PSP staff how to guard against the increasing misuse of AI. It is not clear whether there is institutional guidance to cover AI misuse. The following indicators do not necessarily indicate misuse of AI but if several are present then there should be further investigations.

- The text is lacking a narrative.
- The text contains repetitive parts.
- The text is unrelated to the topic, or too general, or factually wrong, or incoherent.
- The text does not match the expected knowledge of the student.
- The text is not related to the course material.
- The style appears to be "teaching the reader", rather than answering a question. There are sudden changes of writing style, font, or background.
- References in the bibliography do not actually exist (but may look plausible).
- No references from the last 12 months or so.
- The bibliography is in the wrong style or shows changes of style.
- There are no drafts.
- The document has been translated from another language.
- Metadata (such as editing time) look odd or inconsistent.

III. Conclusions

The PSP is in line with the standards of the HAHE, as it is of high quality. Overall, the current student, its graduates, and stakeholders had a generally positive experience with the PSP. However, in terms of admissions the PSP is currently problematic. The extremely low number of students makes this PSP unsustainable. Any statistics emanating from this PSP are also unreliable because of the low number of students. The EEAP finds that the programme is substantially compliant with Principle 4.

Panel Judgement

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

- Intensify PSP promotion through social media and other means of advertising to make the PSP more visible to the graduate community.
- Increase enrolment in the next 3-5 years towards the optimal number of 10 students per academic year.
- Consider changing the PSP title and content to cover the broader field of catalysis and green chemistry, to make it more attractive to current graduates.
- Increase links with industry and introduce industrial placements/internships on a voluntary basis.
- Issue clear guidance to eliminate the misuse of Al.

PRINCIPLE 5: TEACHING STAFF OF POSTGRADUATE STUDY PROGRAMMES

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

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

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

Documentation

- Procedures and criteria for teaching staff recruitment
- Employment regulations or contracts, and obligations of the teaching staff
- Policy for staff support and development
- Individual performance of the teaching staff in scientific-research and teaching work, based on internationally recognised systems of scientific evaluation (e.g. Google Scholar, Scopus, etc.)
- List of teaching staff including subject areas, employment relationship, Institution of origin,
 Department of origin

Study Programme Compliance

I. Findings

The teaching staff of 13 who participate in the teaching of the courses in the PSP are recruited from the institution's Department of Chemistry (currently 10 active, 1 emeritus and 2 retired). The current staff is composed of researchers with good academic indicators (h-index and citations) whereas they are active in supervising students at all levels (undergraduate, graduate, and doctoral). The applicable provisions of the laws are applied for both the selection and the professional development of the faculty members mainly via the Department of Chemistry. In addition to their teaching duties in the PSP, the teaching staff also participate in the other activities of the Department of Chemistry.

II. Analysis

The above findings were supported by the online meetings with the teaching staff, the current student and alumni of the program. It was not possible to determine the reason for the very low student attendance other than the fact that the curriculum has not been kept up to date with new emerging technologies in the specific scientific domain.

III. Conclusions

The PSP has high quality teaching staff pooled from the Department of Chemistry having good academic indicators.

Panel Judgement

Principle 5: Teaching staff of post	graduate
study programmes	
Fully compliant	Х
Substantially compliant	
Partially compliant	
Non-compliant	

- Consider the participation of industry (in collaboration with the student academic advisor) in the postgraduate Thesis.
- Explore the possibility of receiving funding from industry for summer internships during the summer of the first year.

PRINCIPLE 6: LEARNING RESOURCES AND STUDENT SUPPORT

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

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

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

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

Documentation

- Detailed description of the infrastructure and services made available by the Institution to the academic unit for the PSP, to support learning and academic activity (human resources, infrastructure, services, etc.) and the corresponding firm commitment of the Institution to financially cover these infrastructure-services from state or other resources
- Administrative support staff of the PSP (job descriptions, qualifications and responsibilities)
- Informative / promotional material given to students with reference to the available services
- Tuition utilisation plan (if applicable)

Study Programme Compliance

I. Findings

The PSP provides dedicated infrastructure for the delivery of teaching and training of its students. The infrastructure includes classrooms and laboratories. The classrooms and laboratories comply with basic requirements, such as Wi-Fi and audiovisual facilities for classrooms and infrastructure for laboratories. There are several facilities, within walking distance, dedicated to the well-being of students, such as restaurant, student residences, and other facilities for exercise and socializing.

There is administrative staff dedicated to the PSP's support.

II. Analysis

As an integral component of a major university in Greece, the PSP offers a comprehensive range of resources and services to support learning, research, and

academic endeavours. These resources, encompassing human expertise, infrastructure, and support services, are deemed sufficient and conducive to creating an excellent educational environment. Despite facing financial constraints, the PSP manages the allocation of funds to meet the diverse needs of both students and faculty, thereby guaranteeing the success and ongoing expansion of the PSP.

The sole student and the graduates expressed their satisfaction regarding the service received from administrative staff.

III. Conclusions

The PSP fully complies with the requirements of Principle 6.

Panel Judgement

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

- There is a need for a multi-faceted approach to augment the PSP budget, which may include external funding sources, industrial projects, and service-related activities.
- The PSP should enhance the engagement between students and industry by encouraging participation of its alumni and other experts in various relevant activities.

PRINCIPLE 7: INFORMATION MANAGEMENT

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

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

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

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

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

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

Documentation

- Report from the National Information System for Quality Assurance in Higher Education (NISQA) at the level of the Institution, the department, and the PSP
- Operation of an information management system for the collection of administrative data for the implementation of the PSP (Students' Record)
- Other tools and procedures designed to collect data on the academic and administrative functions of the academic unit and the PSP

Study Programme Compliance

I. Findings

The Department of Chemistry maintains a centralized information system to manage the quality assurance process. Course evaluation surveys are conducted and there is a process for analysing and acting upon the evaluation results. Student progression, success, and drop-out rates are monitored. The evaluation of the courses is performed at the end of each semester for all courses and faculty. However, the extremely low number of students renders any analysis unreliable.

The availability of learning resources and student support are good and easily accessible.

The MODIP is mainly responsible for the operation of the quality assurance associated systems. Information and data on faculty performance analysis, administrative support, funding, etc. is also under regular monitoring.

II. Analysis

A sufficient range of information is provided for the needs of the National Information System for Quality Assurance in Higher Education (NISQA) based on the data available. The Department of Chemistry maintains sufficient processes for analyses and evaluation of data related to the availability and accessibility of resources (equipment, social services, IT facilities, etc.), as these are defined at the institutional level. However, the number of admitted students every year is extremely small making statistical conclusions unreliable. Corrective actions following student evaluations are not fully documented and made publicly available on the PSP website.

III. Conclusions

The EEAP finds that, overall, the programme fully complies with Principle 7. The PSP collects and analyses all data related to quality assurance and performs analysis of the collected course evaluation data at instructors' level. However, the extremely low number of students renders these statistics unreliable.

Panel Judgement

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

- Actions emanating from student evaluations, as well as all past and future PSP evaluations should be clearly documented and made publicly available through the PSP website.
- An alumni portal may be developed to promote networking and post-graduation interactions among graduates and further collaborations with the PSP.

PRINCIPLE 8: PUBLIC INFORMATION CONCERNING THE POSTGRADUATE STUDY PROGRAMMES

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

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

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

Documentation

- Dedicated segment on the website of the department for the promotion of the PSP
- Bilingual version of the PSP website with complete, clear and objective information
- Provision for website maintenance and updating

Study Programme Compliance

Findings

The Department of Chemistry and the PSP website are available in Greek and English. Both PSP websites are user-friendly. However, there are noticeable differences. Both websites provide a short description of the program and its purpose. The Greek version contains a copy of the latest law regarding the PSP (Φ EK 2762/11-7-2018 τ .B'), a short video by the Director of the PSP regarding the program and its facilities, a list of PSP offered courses per semester, their descriptions, and instructors names per course, information on the Director of the PSP and its faculty with CVs, a copy of the PSP quality assurance, information on patents and publications related to the PSP, information of various PSP regulations, a link to the Study Guide, a news and events menu, and a link for the PSP internal evaluation by MODIP. Moreover, it contains contact information for the public. The English version of the program contains less information than its Greek counterpart. Specifically, the studies regulations, the PSP internal evaluation, and the lectures schedule are missing.

II. Analysis

The PSP posts extensive information on its website, which is mostly available in Greek. The PSP English website has less information than the Greek counterpart, but it is at an acceptable level.

The presence of menus in Greek on the English website is confusing for Englishspoken students and for the public in general.

Some of the faculty CVs are not up to date, which could potentially cause problems to students selecting their research advisor for completing their thesis. Moreover,

there is no information on the weights of individual examinations used towards the student final course grade for all listed courses.

III. Conclusions

The PSP has two websites that can provide sufficient information to both Greek and English spoken students. Thus, the PSP fully satisfies principle 8.

Panel Judgement

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

- The PSP should increase efforts to provide the exact same information in both its Greek and English version of its website.
- The Study Guide must be updated, including details on the weights of individual examinations used towards the student final course grade for all listed courses.

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

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

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

The above comprise the evaluation of:

- a) the content of the programme in the light of the latest research in the given discipline, thus ensuring that the PSP is up to date
- b) the changing needs of society
- c) the students' workload, progression and completion of the postgraduate studies
- d) the effectiveness of the procedures for the assessment of students
- e) the students' expectations, needs and satisfaction in relation to the programme
- f) the learning environment, support services, and their fitness for purpose for the PSP in question Postgraduate study programmes are reviewed and revised regularly involving students and other stakeholders. The information collected is analysed and the programme is adapted to ensure that it is up-to-date.

Documentation

- Procedure for the re-evaluation, redefinition and updating of the PSP curriculum
- Procedure for mitigating weaknesses and upgrading the structure of the PSP and the learning process
- Feedback processes concerning the strategy and quality goal setting of the PSP and relevant decision-making processes (students, external stakeholders)
- Results of the annual internal evaluation of the PSP by the Quality Assurance Unit (QAU), and the relevant minutes

Study Programme Compliance

I. Findings

The PSP self-assessment procedure takes place annually, with the support of the MODIP. The quality assurance targets are set annually for all postgraduate programmes of the Department of Chemistry. The findings of the PSP self-assessment are shared within the academic unit. The PSP is evaluated using student evaluations. The panel found no information on surveys from graduates and external stakeholders.

The PSP is in line with the current research in the field. This is verified by the program course descriptions and the faculty publications. Copies of student dissertations are not publicly available.

II. Analysis

The PSP collects data, which is used for its improvements. The student evaluation

surveys serve as an indirect assessment method for the PSP. The lack of satisfaction surveys from the PSP graduates and external stakeholders hampers the program assessment. Students, graduates, and other stakeholders do not appear to have been directly involved in the decision-making processes towards curriculum improvement.

Due to the very low number of enrolled students, no statistics can be drawn regarding the student participation in the course evaluations.

III. Conclusions

The PSP is assessed predominantly through student surveys. However, it does not fully satisfy Principle 9 due to the lack of a feedback mechanism from the graduates and external stakeholders and the absence of engagement of students, graduates, and external stakeholders in its improvements.

Panel Judgement

Principle 9: On-going monitoring and pe evaluation of postgraduate study programmes	riodic interna
Fully compliant	
Substantially compliant	Х
Partially compliant	
Non-compliant	

- The PSP must develop satisfaction surveys for its graduates and external stakeholders involved with the program.
- The PSP should consider developing an External Advisory Board, with faculty, students, graduates, and external stakeholders to actively assist in the program improvements.

PRINCIPLE 10: REGULAR EXTERNAL EVALUATION OF POSTGRADUATE STUDY PROGRAMMES

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

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

Documentation

 Progress report of the PSP in question, on the results from the utilisation of possible recommendations included in the External Evaluation Report of the Institution, and in the IQAS Accreditation Report, with relation to the postgraduate study programmes

Study Programme Compliance

I. Findings

The PSP has not been previously subjected to an external evaluation for accreditation purposes. However, it provides a progress report to parts of the NKUA accreditation, which took place on November 7, 2015, and are pertaining to the PSP.

II. Analysis

The current evaluation is the PSP's first external accreditation review. Some recommendations from the 2015 review are also applicable to the department's postgraduate programmes. Since then, several changes were implemented to the PSP towards its improvement following the institution's review. The EEAP found that the PSP faculty and supporting staff were very helpful in answering the panel's questions during the current review. Moreover, they showed that they understand the importance of the accreditation process and the panel's recommendations. The PSP follows a commonly used procedure for the utilization of the outcomes of the external evaluation. These outcomes are shared with the PSP organizing committee, the OMEA, the Head Department of Chemistry, and the MODIP.

III. Conclusions

The PSP has not been evaluated in the past by an external committee for accreditation purposes. However, several recommendations from the 2015 institution external review have been implemented by the PSP. The PSP is in full compliance with Principle 10.

Panel Judgement

Principle 10: Regular external evaluation of postgrammes	raduate study
Fully compliant	Х
Substantially compliant	
Partially compliant	
Non-compliant	

Panel Recommendations

None.

PART C: CONCLUSIONS

I. Features of Good Practice

- The PSP is of high quality and scientifically sound, offering job placement opportunities for its graduates.
- The students' overall experience is very positive. The enthusiasm of current students, recent graduates, employers, and other stakeholders was evident.
- The faculty and staff are of international reputation, enthusiastic, and dedicated to their mission.
- Employers and social partners praised the PSP and believe there is a clear need for such graduates.
- The PSP admission criteria are very well-defined, diverse, and transparent.

II. Areas of Weakness

- The number of enrolled students has been very low for several years.
- All statistics drawn are not reliable due to the low number of enrolled students for several years.
- There is no well-defined process for students, graduates, and external stakeholders to participate in the PSP improvement.
- The English and Greek websites do not contain the exact same information.
- There is no External Advisory Board.

III. Recommendations for Follow-up Actions

- Increase student enrolment in the next 3-5 years towards the optimal number of 10 students per academic year to ensure the PSP long-term sustainability.
- Consider changing the PSP title and content to cover the broader field of catalysis and green chemistry, to make it more attractive to current graduates.
- Implement major PSP improvements as a result of course/instructor evaluations, document and communicate to all involved, and publish all relevant information on the website.
- Explore new methods of student engagement, such as tutorials, new pedagogical methods of learning, mid-term examinations, quizzes, etc.

- Establish a formal process for the active participation of students in the curriculum development of the programme.
- Issue clear guidance to eliminate the misuse of AI.
- Enhance engagement between students and industry by encouraging participation of its alumni and other experts in various relevant activities.
- Develop satisfaction surveys for its graduates and external stakeholders involved with the program.
- Establish a formal External Advisory Board to guide continuous review, revision, and further development of the curriculum.

IV. Summary & Overall Assessment

The Principles where full compliance has been achieved are: 3, 5, 6, 7, 8, 10.

The Principles where substantial compliance has been achieved are: 1, 2, 4, 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	Х
Substantially compliant	
Partially compliant	
Non-compliant	

The members of the External Evaluation & Accreditation Panel

Name and Surname Signature

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