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External evaluation report

- **Higher education institution:**
University of Nicosia (UNIC)
- **Town:** Nicosia
- **Programme of study (Name, ECTS, duration, cycle)**

In Greek:

Επιστήμη Δεδομένων (1.5 έτη, 90 ECTS,
Μεταπτυχιακό Δίπλωμα)

In English:

Data Science (1.5 years, 90 ECTS, Master of
Science)

- **Language of instruction:** English
- **Programme's status**
New programme: X

The present document has been prepared within the framework of the authority and competencies of the Cyprus Agency of Quality Assurance and Accreditation in Higher Education, according to the provisions of the “Quality Assurance and Accreditation of Higher Education and the Establishment and Operation of an Agency on Related Matters Laws of 2015 and 2016” [N. 136 (I)/2015 and N. 47(I)/2016].

A. Introduction

The External Evaluation Committee was briefed at the lobby of the Landmark hotel by Ms. Emily Mouskou, from the Agency of Quality Assurance and Accreditation in Higher Education, and then accompanied to the University of Nicosia.

The External Evaluation Committee was joined for the management of the university and the faculty of the programs on evaluation. They received presentations from the Rector, Vice Rector, PSU, ePSU of the University on the structure, the history and the academic programmes of the university. This was followed by a presentation that described the Distance Learning Unit. The programme was presented by the programme coordinator, associate professor Ioannis Katakis. In the afternoon, the External Evaluation Committee visited the facilities of the university and the Distance Learning office.

Members of the External Evaluation Committee were able to ask questions throughout these presentations and there was an interesting and informative dialogue. Following this the External Evaluation Committee was able to have separate meetings with full time faculty and students of the Computer Science Department.

B. External Evaluation Committee (EEC)

<i>Name</i>	<i>Position</i>	<i>University</i>
Giorgos Longinos	Student	University of Cyprus
Jordi Conesa i Caralt	Associate Professor	Open University of Catalonia
Konstantinos Stefanidis	Associate professor	Tampere University
Yannis Theodoridis	Professor	University of Piraeus
Philippe Bonnet (chair)	Professor	IT University of Copenhagen

C. Guidelines on content and structure of the report

1. Study programme and study programme's design and development

(ESG 1.1, 1.2, 1.8, 1.9)

Standards

- *Policy for quality assurance of the programme of study:*
 - *has a formal status and is publicly available*
 - *supports the organisation of the quality assurance system through appropriate structures, regulations and processes*
 - *supports teaching, administrative staff and students to take on their responsibilities in quality assurance*
 - *ensures academic integrity and freedom and is vigilant against academic fraud*
 - *guards against intolerance of any kind or discrimination against the students or staff*
 - *supports the involvement of external stakeholders*

- *The programme of study:*
 - *is designed with overall programme objectives that are in line with the institutional strategy and have explicit intended learning outcomes*
 - *is designed by involving students and other stakeholders*
 - *benefits from external expertise*
 - *reflects the four purposes of higher education of the Council of Europe (preparation for sustainable employment, personal development, preparation for life as active citizens in democratic societies, the development and maintenance, through teaching, learning and research, of a broad, advanced knowledge base)*
 - *is designed so that it enables smooth student progression*
 - *defines the expected student workload in ECTS*
 - *includes well-structured placement opportunities where appropriate*
 - *is subject to a formal institutional approval process*
 - *results in a qualification that is clearly specified and communicated, and refers to the correct level of the National Qualifications Framework for Higher Education and, consequently, to the Framework for Qualifications of the European Higher Education Area*
 - *is regularly monitored in the light of the latest research in the given discipline, thus ensuring that the programme is up-to-date*
 - *is periodically reviewed so that it takes into account the changing needs of society, the students' workload, progression and completion, the effectiveness of procedures for assessment of students, student expectations, needs and satisfaction in relation to the programme*
 - *is reviewed and revised regularly involving students and other stakeholders*

- *Public information (clear, accurate, objective, up-to date and readily accessible):*
 - *about the programme of study offered*
 - *the selection criteria*
 - *the intended learning outcomes*
 - *the qualification awarded*
 - *the teaching, learning and assessment procedures*
 - *the pass rates*

- *the learning opportunities available to the students*
- *graduate employment information*

Findings

The programme of study focuses on the computer science, mathematics as well as on the domain knowledge components of data science. It is timely and relevant. Its objectives and intended learning outcomes are aligned and compatible with distance learning education.

The programme duration of 1,5 years with optional thesis is compatible with Cypriot law and in line with the university strategy. However, this lack of focus on independent study and training in the research process does not compare positively with respect to other programmes in Europe or internationally.

The programme design is sound, informed by research and based on appropriate preparatory work. It was designed by a committee of academics with consultations with industry and international institutions.

The programme supports student progression. There is a balance between computer science, mathematics and domain knowledge. The contribution of each course to the learning outcomes of the programme is clear and distinct. The programme assumes that students have a good degree of programming and mathematics proficiency. There are no courses, workshops, preparatory sessions or special tutoring allowing students to catch up. There is no focus on learner's general competencies, which is appropriate in a MSc Distance Learning programme.

The programme builds on the excellent distance learning framework from University of Nicosia in terms of quality assurance, student feedback, pedagogical support for faculty, approval and review process and IT support. There are mechanisms in place to detect plagiarism and processes to address fraud cases.

Strengths

The programme is well-designed, relevant, timely. It builds on the existing strengths of the distance learning education at U.Nicosia.

The programme management and teaching staff are of high quality.

The project in Data Science, taught by industry collaborators is a competitive advantage for the programme.

Areas of improvement and recommendations

The optional nature of the thesis is a weak point of the programme.

The programme does not provide special support in programming and mathematics for students whose proficiency is not sufficient to effectively follow the programme. A recommendation could be to either (a) introduce tests to screen students before admission

and/or to (b) introduce workshops/courses that make it possible for students to build up/refresh their programming and mathematics skills before the start of the programme.

The university is strong in the areas of medicine and pedagogy. The proposed MSc program contains one subject on the application of data science in the context of medicine, but not in the context of pedagogy. Therefore, the EEC believes it would be possible and interesting to add one subject about learning analytics in the program. It may also be a trigger to enhance research interdisciplinarity opportunities with the education area of the university.

The EEC considers that the discussion about the Big Data era in the curriculum is weak; a suggestion would be that an introductory discussion on Big Data models and architectures is included in COMP-543DL and a deeper presentation appears in COMP-548DL.

Mark from 1 to 10 the degree of compliance for each quality indicator/criterion

1 – 4: Non-compliant

5 or 6: Partially compliant

7 or 8: Substantially compliant

9 or 10: Fully compliant

Quality indicators/criteria		1 - 10
1.1	Academic oversight of the programme design is ensured	10
1.2	The guide and / or the regulations for quality assurance provide the adequate information and data for the support and management of the programme of study for all the years of study.	8
1.3	Internal Quality Assurance processes safeguard the quality and the fulfillment of the programme's purpose, objectives and the achievement of the learning outcomes. Particularly, the following are taken into consideration:	
1.3.1	The disclosure of the programme's curricula to the students and their implementation by the teaching staff	10
1.3.2	The programme webpage information and material	NAP
1.3.3	The procedures for the fulfillment of undergraduate and postgraduate assignments / practical training	8
1.3.4	The procedures for the conduct and the format of the examinations and for student assessment	8
1.3.5	Students' participation procedures for the improvement of the programme and of the educational process	8
1.4	The purpose and objectives of the programme are consistent with the expected learning outcomes and with the mission and the strategy of the institution.	10

1.5	The following ensure the achievement of the programme's purpose, objectives and the learning outcomes:		
1.5.1	The number of courses		7
1.5.2	The programme's content		7
1.5.3	The methods of assessment		7
1.5.4	The teaching material		7
1.5.5	The equipment		7
1.5.6	The balance between theory and practice		7
1.5.7	The research orientation of the programme		5
1.5.8	The quality of students' assignments		7
1.6	The expected learning outcomes of the programme are known to the students and to the members of the teaching staff.		10
1.7	The teaching and learning process is adequate and effective for the achievement of the expected learning outcomes.		7
1.8	The content of the programme's courses reflects the latest achievements / developments in science, arts, research and technology.		7
1.9	New research results are embodied in the content of the programme of study.		7
1.10	The content of foundation courses is designed to prepare the students for the first year of their chosen undergraduate degree.		NAP
1.11	Students' command of the language of instruction is appropriate.		8
1.12	The programme of study is structured in a consistent manner and in sequence, so that concepts operating as preconditions precede the teaching of other, more complex and cognitively more demanding, concepts.		8
1.13	The learning outcomes and the content of the courses are consistent.		8
1.14	The European Credit Transfer System (ECTS) is applied and there is correspondence between credits, workload and expected learning outcomes per course and per semester.		8
1.15	The higher education qualification awarded to the students corresponds to the purpose, objectives and the learning outcomes of the programme.		5
1.16	The higher education qualification and the programme of study conform to the provisions for registration to their corresponding professional and vocational bodies for the purpose of exercising a particular profession.		8

1.17	The programme's management in regard to its design, its approval, its monitoring and its review, is in place.	10
1.18	The programme's collaborations with other institutions provide added value and are compared positively with corresponding collaborations of other departments / programmes of study in Europe and internationally.	7
1.19	Procedures are applied so that the programme conforms to the scientific and professional activities of the graduates.	7
1.20	The admission requirements are appropriate.	5
1.21	Sufficient information relating to the programme of study is posted publicly.	8
1.22	The teaching methodology is suitable for teaching in higher education.	9

The optional nature of the thesis, while legal, does not support the research orientation of the programme, and does not allow to compare positively the higher education qualification awarded to other MSc degrees in Europe or internationally.

The admission process should ensure that students have appropriate competencies and skills in programming and mathematics.

Please circle one of the following for:

Study programme and study programme's design and development

Non-compliant

Partially compliant

Substantially compliant

Fully compliant

2. Teaching, learning and student assessment (ESG 1.3)

Standards

- *The process of teaching and learning supports students' individual and social development and respects their needs.*
- *The process of teaching and learning is flexible, considers different modes of delivery, where appropriate, uses a variety of pedagogical methods and facilitates the achievement of planned learning outcomes.*
- *Students are encouraged to take an active role in creating the learning process.*
- *The implementation of student-centered learning and teaching encourages a sense of autonomy in the learner, while ensuring adequate guidance and support from the teacher.*
- *Teaching methods, tools and material used in teaching are modern, effective, support the use of modern educational technologies and are regularly updated.*

- *Practical and theoretical studies are interconnected.*
- *The organisation and the content of practical training, if applicable, support achievement of planned learning outcomes and meet the needs of the stakeholders.*
- *Mutual respect within the learner-teacher relationship is promoted.*
- *Assessment is appropriate, transparent, objective and supports the development of the learner.*
- *The criteria for and method of assessment, as well as criteria for marking, are published in advance.*
- *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.*
- *Assessment, where possible, is carried out by more than one examiner.*

Findings

UNIC is a rather young institution with about 12 years of presence as a HEI in Cyprus. Nevertheless, in this period it has presented a high number of teaching activities, through which it has gained a lot of experience in teaching and learning methodology and processes.

Especially for DL, the Department of Comp Sci has limited past experience; this fact however is overcome by UNIC's extensive experience of years in DL, with its running programmes already accredited by state authorities (ECPU and CYQAA). This is a kind of warranty that everything runs smoothly, considering both tutors and learners of this new programme. For instance, UNIC maintains a dedicated DL unit / helpdesk with a number of ~10 persons devoted to operating and supporting DL programmes.

The tutors pass a 36 hours faculty professional development seminar on teaching and learning theory and practice offered by ePSU (e-Learning Pedagogical Support Unit).

According to the institution's quality standards and indicators, courses include general and weekly forum discussions to enhance learning and promote interactivity, exchange of ideas, discussions and active class participation both on a faculty-student and student-to-student levels. The institution's policy for lecturers requires them to be responsible for updating their material. At the beginning of each semester, lecturers are required to submit /re-submit the course materials to be available on-line. A new course outline – with updated reading materials, textbooks, cases, etc. must be submitted and uploaded, as well as any other course materials, such as lecture notes, case studies, etc. Accuracy is maintained through inspection of the materials.

The teaching staff base their teaching and assessment methods on objectives and intended learning outcomes. Innovative teaching methods are used in educational activities and the teaching staff is using new technology (Moodle, WebEx, etc.) in order to make the teaching process more effective. Theory and practice are interconnected in teaching and learning. All the above are ensured through the periodic surveys from learner's side and the communication with the program coordinator from the teacher's side.

Practical training is non-applicable in this programme, mainly due to its DL nature. On the other hand, there is course COMP-592DL (compulsory, 4 ECTS) through which, students

have the opportunity to be actively involved in research performed by teaching staff. Unfortunately, the final thesis project is left as option to the students (and, according to the feedback received by the faculty, only a small minority of students are expected to take this option), which means that the majority of students will miss the opportunity to be involved in a real-world research task.

Strengths

The programme is designed according to international standards of teaching and learning with respect to pedagogical methods, modes of delivery, and variety of learning outcomes. The process of teaching and learning takes into consideration the specific students' needs. Teaching methods, tools and material used in teaching are modern, effective, and support the use of modern educational technologies. The programme presents a balanced mixture of practical and theoretical teaching hours.

Assessment is appropriate, transparent, objective and supports the development of the learner. The criteria for and method of assessment, as well as criteria for marking, are published in advance. 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.

Areas of improvement and recommendations

UNIC should consider changing the final assessment process. Currently, the assessment is made through written exams, which is not the most appropriate manner for a DL programme (it requires students to move to examination centres, etc.). According to the institution representatives, this is due to state legislation, but the EEC feels that it should be underlined as a strong recommendation to both UNIC and CYQAA.

It was not clear how students are encouraged to take an active role in creating the learning process.

A Data Science programme is typically built upon two scientific background pillars, namely Computer Science and Maths/Statistics; thus, it is important that students' different abilities on these two topics are considered seriously through some preparatory workshops.

The final thesis project is optional, which means that several (perhaps, the vast majority of) students will miss the opportunity to be actively involved in a real-world research task. UNIC should seriously consider changing its status to compulsory.

It is not clear whether people outside of UNIC are involved in the assessment of learning outcomes, especially during the defense of the final project thesis. The EEC highly recommends it.

The EEC recommends that UNIC explores a more lightweight process for faculty development, focusing more on quality than quantity.

Mark from 1 to 10 the degree of compliance for each quality indicator/criterion

1 – 4: Non-compliant

5 or 6: Partially compliant

7 or 8: Substantially compliant

9 or 10: Fully compliant

Quality indicators/criteria		1 - 10
2.1	The actual/expected number of students in each class allows for constructive teaching and communication.	7
2.2	The actual/expected number of students in each class compares positively to the current international standards and/or practices.	7
2.3	There is an adequate policy for regular and effective communication with students.	9
2.4	The methodology implemented in each course leads to the achievement of the course's purpose and objectives and those of the individual modules.	9
2.5	Constructive formative assessment for learning and feedback are regularly provided to the students.	8
2.6	The assessment system and criteria regarding student course performance are clear, adequate, and known to the students.	9
2.7	Educational activities which encourage students' active participation in the learning process are implemented.	8
2.8	Teaching incorporates the use of modern educational technologies that are consistent with international standards, including a platform for the electronic support of learning.	9
2.9	Teaching materials (books, manuals, journals, databases, and teaching notes) meet the requirements set by the methodology of the programme's individual courses and are updated regularly.	9
2.10	It is ensured that teaching and learning are continuously enriched by research.	8
2.11	The programme promotes students' research skills and inquiry learning.	5
2.12	Students are adequately trained in the research process.	8

The final thesis project is optional, which means that some students may miss the opportunity to be actively involved in a real-world research task.

Please circle one of the following for:

Teaching, learning and student assessment

Non-compliant

Partially compliant

Substantially compliant

Fully compliant

3. Teaching Staff (ESG 1.5)

Standards

- Fair, transparent and clear processes for the recruitment and development of the teaching staff are set up.
- Teaching staff qualifications are adequate to achieve the objectives and planned learning outcomes of the study programme, and to ensure quality and sustainability of the teaching and learning.
- The teaching staff collaborate in the fields of teaching and research within the HEI and with partners outside (practitioners in their fields, employers, and staff members at other HEIs in Cyprus or abroad).
- Recognised visiting teaching staff participates in teaching the study programme.
- The teaching staff is regularly engaged in professional and teaching-skills training and development.
- Assessment of the teaching staff takes into account the quality of their teaching, their research activity, the development of their teaching skills and their mobility.

Findings

Overall, regarding the teaching staff, the Data Science MSc Programme of the University of Nicosia is fully compliant. The teaching staff includes experienced scientists in the data science domain with qualifications that meet the objectives of the programme, and collaborations with both industry and academia. Teaching is connected with research, and teaching performance is assessed via questionnaires completed by the students. The teaching team includes both genders, both young and senior faculty at different ranks.

Strengths

The teaching staff includes experienced scientists in the data science domain, showing a fair and clear method regarding the recruiting process.

The qualifications of the staff clearly meet the objectives of the programme and its planned learning outcomes.

The teaching staff has established collaborations with both industry and academia within Cyprus and worldwide.

The teaching staff is engaged in professional and teaching-skills training, especially on how to use the distance learning tools.

There exist regular development discussions for assessing the teaching and research quality of the teaching and research quality.

It is nice to see that teaching is connected with research as this showed by the publications produced in collaboration with students in the programmes the teaching staff participate currently.

The teaching performance is assessed via feedback questionnaires completed by the students of the programme. Teaching performance, as well as research performance, affect teachers' evaluation. Specialized seminars are organized for improving professors' teaching skills.

The teaching team is nicely built: both genders, both young and senior faculty at different ranks. Professors are well-qualified.

The teaching team includes visiting teaching staff from other institutions and companies.

Areas of improvement and recommendations

To increase the visibility and internationalization of the programme, recognized visiting professors can be invited for giving lectures of specialized topics.

If the new programme is accepted, and given the current workload of the teachers, they should get rid of part of their existing teaching load, so as to have a reasonable amount of teaching hours and available time for research.

Mark from 1 to 10 the degree of compliance for each quality indicator/criterion

1 – 4: Non-compliant

5 or 6: Partially compliant

7 or 8: Substantially compliant

9 or 10: Fully compliant

Quality indicators/criteria		1 - 10
3.1	The number of full-time teaching staff, occupied exclusively at the institution, and their fields of expertise, adequately support the programme of study.	9

3.2	The members of teaching staff for each course have the relevant formal and fundamental qualifications for teaching the course, including the following:		
	3.2.1	Subject specialisation	9
	3.2.2	Research and Publications within the discipline	8
	3.2.3	Experience / training in teaching in higher education	8
3.3	The programme attracts visiting professors of recognized academic standing.		8
3.4	The specialisations of visiting professors adequately support the programme of study.		8
3.5	Special teaching staff and special scientists have the necessary qualifications, adequate work experience and specialisation to teach a limited number of courses in the programme of study.		9
3.6	In the programme of study, the ratio of the number of courses taught by full-time staff, occupied exclusively at the institution, to the number of courses taught by part-time staff, ensures the quality of the programme of study.		9
3.7	The ratio of the number of students to the total number of teaching staff supports and safeguards the programme's quality.		9
3.8	The teaching load allows for the conduct of research and contribution to society.		7
3.9	The programme's coordinator has the qualifications and experience to coordinate the programme of study.		10
3.10	The results of the teaching staff's research activity are published in international journals with the peer-reviewing system, in international conferences, conference minutes, publications etc.		9
3.11	The teaching staff is provided with adequate training opportunities in teaching methods, adult education and new technologies.		8
3.12	Feedback processes for teaching staff in regard to the evaluation of their teaching work, by the students, are satisfactory.		9
The special teaching staff does not exceed 30% of the permanent teaching staff.			

Please circle one of the following for:

Teaching Staff

Non-compliant

Partially compliant

Substantially compliant

Fully compliant

4. Students (ESG 1.4, 1.6, 1.7)

Standards

- *Pre-defined and published regulations regarding student admission, progression, recognition and certification are in place.*
- *Access policies, admission processes and criteria are implemented consistently and in a transparent manner.*
- *Information on students, like key performance indicators, profile of the student population, student progression, success and drop-out rates, students' satisfaction with their programmes, learning resources and student support available, career paths of graduates, is collected, monitored and analysed.*
- *Fair recognition of higher education qualifications, periods of study and prior learning, including the recognition of non-formal and informal learning, are essential components for ensuring the students' progress in their studies, while promoting mobility.*
- *Students receive certification explaining the qualification gained, including achieved learning outcomes and the context, level, content and status of the studies that were pursued and successfully completed.*
- *Student support is provided covering the needs of a diverse student population (such as mature, part-time, employed and international students, as well as students with disabilities).*
- *A formal procedure for student appeals is in place.*
- *Students are involved in evaluating the teaching staff.*
- *Students' mobility is encouraged and supported.*

Findings

The EEC believes that the university provides high level support and services to students. KESY provides the adequate help to students that have special needs or a personal difficulty. Students participate in internal evaluation mechanisms, but they should also have the opportunity to see the effects of their feedback. The EEC is concerned regarding the absence of a requirement regarding the programming skills needed to participate in the program.

Strengths

The teaching staff is easily accessible by the students.

All the regulations regarding student progression, recognition and certification are in place.

There are adequate welfare mechanisms to support the students through KESY.

The students have the opportunity to provide feedback to the university and to participate in the internal evaluation procedures.

The adequate support is provided to students with special needs or disabilities.

Areas of improvement and recommendations

The EEC believes that programming background is necessary to participate in this program. Therefore, the admissions requirements should either discourage students with no programming background to apply for this program or provide extra courses to get the required programmed skills.

Mark from 1 to 10 the degree of compliance for each quality indicator/criterion

1 – 4: Non-compliant

5 or 6: Partially compliant

7 or 8: Substantially compliant

9 or 10: Fully compliant

Quality indicators/criteria		1 - 10
4.1	The student admission requirements for the programme of study are based on specific regulations and suitable criteria that are favourably compared to international practices.	7
4.2	The award of the higher education qualification is accompanied by the diploma supplement which is in line with European and international standards.	7
4.3	The programme's evaluation mechanism, by the students, is effective.	10
4.4	Students' participation in exchange programmes is compared favourably to similar programmes across Europe.	NAP
4.5	There is a student welfare service that supports students in regard to academic, personal problems and difficulties.	10
4.6	Statutory mechanisms, for the support of students and the communication with the teaching staff, are effective.	10
4.7	Mentoring of each student is provided and the number of students per each permanent teaching member is adequate.	10
4.8	Flexible options / adaptable to the personal needs or to the needs of students with special needs, are provided.	7
4.9	Students are satisfied with their learning experiences.	NAP
<p>The EEC believes that programming knowledge should be added to the admissions requirements for this programme.</p>		

Please circle one of the following for:

Students

Non-compliant

Partially compliant

Substantially compliant

Fully compliant

5. Resources (ESG 1.6)

Standards

- *Adequate and readily accessible resources (teaching and learning environments, teaching materials, teaching aids and equipment, financial, physical and human support resources*) are provided to students and support the achievement of objectives in the study programme.*
** Physical resources: premises, libraries, study facilities, IT infrastructure, etc.*
Human support resources: tutors/mentors, counsellors, other advisers, qualified administrative staff
- *Adequacy of resources is ensured for changing circumstances (change in student numbers, etc.).*
- *All resources are fit for purpose and students are informed about the services available to them.*
- *Teaching staff is involved in the management of financial resources regarding the programme of study.*

Findings

The EEC generally believes that the environments provided by the university are adequate to support learning and to support the design and implementation of teaching. The classrooms and laboratories are well dimensioned and sized, the technological infrastructure is good, the library provides a good amount of resources, both physically and virtually, and they have appropriate tools that support teaching and learning, including Moodle, Webex, Planet E-stream. The university also provides some rooms where to make recordings and conduct virtual meetings with students, with the support of the distance learning unit.

According to students, the university provides necessary assistance through KESY. The welfare services provide the adequate support to students and there are enough learning resources to help them during their studies.

According to faculty members, the university provides pedagogical support for designing, implementing and evaluating conventional and online courses, both face-to-face and distance learning by the PSU and ePSU units.

Strengths

The University welfare system for undergraduate and postgraduate students seems to be a very useful and complete service to support students during their learning.

The EEC believes that the university has adequate mechanisms to provide the necessary assistance to students with disabilities.

The ePSU unit is considered a best practice, due to its structure, its resources, its infrastructures and its services. We believe that they can be a powerful support for guaranteeing and maintaining the quality of the provided teaching.

The Distance Learning Faculty Handbook provided for the ePSU is a useful resource that establishes the main characteristics a distance learning course should have. It is a good reference document that guarantees the quality and homogeneity of the distance learning course.

The weekly guides used in the courses to determine the work to be done every week for the students is also considered a best practice.

As a distance learning program, the learning resources are continuously available to students.

Areas of improvement and recommendations

Even though the materials provide a good variety (videos, papers, e-books, etc.) which is good for distance learning, we believe that some considerations should be taken into account to the video materials to be more usable and accessible for students: make them shorter (usually videos in this context should not exceed 7 minutes), include the teacher in the video to provide the non-verbal communication, to add subtitles for accessibility questions.

Another improvement that would greatly benefit students would be the addition of intelligent tutor systems to support immediate and automatic feedback to students and a testing environment to test their advances.

Mark from 1 to 10 the degree of compliance for each quality indicator/criterion

1 – 4: Non-compliant

5 or 6: Partially compliant

7 or 8: Substantially compliant

9 or 10: Fully compliant

Quality indicators/criteria		1 - 10
5.1	Adequate and modern learning resources are available to the students.	7
5.2	The library includes the latest books and material that support the programme.	9
5.3	The library loan system facilitates students' studies.	8
5.4	The laboratories adequately support the programme.	8
5.5	Student welfare services are of high quality.	10
5.6	Statutory administrative mechanisms for monitoring and supporting students are sufficient.	10
5.7	Suitable books and reputable journals support the programme of study.	9

5.8	An internal communication platform supports the programme of study.	8
5.9	The equipment used in teaching and learning (laboratory and electronic equipment, consumables etc.) are quantitatively and qualitatively adequate.	9
5.10	Teaching materials (books, manuals, scientific journals, databases) are adequate and accessible to students.	10
5.11	Teaching materials (books, manuals, scientific journals, databases) are updated regularly with the most recent publications.	NAP

Please circle one of the following for:

Resources

Non-compliant

Partially compliant

Substantially compliant

Fully compliant

6. Additional for distance learning programmes (ALL ESG)

Standards

- **The distance learning methodology is appropriate for the particular programme of study.**
- A pedagogical planning unit for distance learning, which is responsible for the support of the distance learning unit and addresses the requirements for study materials, interactive activities and formative assessment in accordance to international standards, is established.
- Feedback processes for students in relation to written assignments are set.
- A specific plan is developed to ensure student interactions with each other, with the teaching staff, and the study material.
- Teacher training programmes focusing on interaction and the specificities of distance learning are offered.
- A complete assessment framework is designed, focusing on distance learning methodology, including clearly defined evaluation criteria for student assignments and the final examination.
- Expected teleconferences for presentations, discussion and question-answer sessions, and guidance are set.
- A study guide for each course, fully aligned with distance learning methodology and the need for student interaction with the material is developed. The study guide should include, for each course week / module, the following:
 - Clearly defined objectives and expected learning outcomes of the programme, of the modules and activities in an organised and coherent manner
 - Presentation of course material, on a weekly basis, in a variety of ways and means (e.g. printed material, electronic material, teleconferencing, multimedia)
 - Weekly outline of set activities and exercises and clear instructions for creating posts, discussion, and feedback
 - Self-assessment exercises and self-correction guide
 - Bibliographic references and suggestions for further study

- *Number of assignments/papers and their topics, along with instructions and additional study material*
- *Synopsis*

Findings

The distance learning methodology is appropriate for the particular program of study. The university assesses its quality by external and voluntary accreditations, such as the ones of QS Stars or EADTU.

The university has a unit responsible for providing pedagogical support for designing, creating, implementing and evaluating online courses (ePSU). The unit addresses the requirements for study materials, interactive activities and formative assessment in accordance to international standards.

The proposed courses have a complete syllabus plus a weekly study guide that includes relevant information: objectives, learning outcomes expected, material to use, activities to perform, discussions to address and complementary bibliographic references. Each course has a minimum of 9 hours of synchronous communication between teacher and students.

The collaboration among students is promoted by some activities. Collaboration among teachers and students (and among students) is conducted through the forums of the subject and other forums that can be created ad-hoc for facing special needs.

During the courses, feedback to students are provided regularly by teachers. From the documentation provided and the information gathered from the meeting, it was not clear if rubrics are used in the courses to face evaluations, neither whether these rubrics, if existent, are shared to students. Final evaluation may be by a final exam or with a practical activity in some cases.

The university provides a workshop (and plan to develop new ones in the future) to train teachers in distance learning. In addition, the faculty handbook and the ePSU services provide a good ground to teachers to face distance learning.

Strengths

The ePSU unit is considered a best practice, due to its structure, its resources, its infrastructures and its services. The EEC believes that it can be a powerful support for guaranteeing and maintaining the quality of the provided teaching.

Being continually evaluated by non-mandatory external accreditation organizations is a good practice.

The Distance Learning Faculty Handbook provided by the ePSU is a useful resource that establishes the main characteristics a distance learning course should have. It is a good reference document that guarantees the quality and homogeneity of the distance learning course.

The weekly study guides used in the courses to determine the work to be done every week for the students is also considered a best practice.

The fact that real world problems will be faced by students though the use of Expedia data and M-competition is considered a strong point of the program.

The policies they have regarding the way the teachers should communicate to students and the time limit (48 hours) before responding. In addition, the provision of nine hours of synchrony between teacher and students for each subject is a good practice that can improve grades and avoid dropout when used efficiently. The use of synchronous mobile messaging systems, such as slack, may be a good asset, since it may greatly facilitate communication between faculty and students.

Areas of improvement and recommendations

According to the videos shown during the visit, the EEC believes that some considerations should be taken into account to the video materials to be more usable and accessible for students. At least, it would be convenient to make them shorter (usually videos in this context should not exceed 7 minutes), include the teacher in the video to provoke the non-verbal communication and add subtitles for accessibility questions.

Weekly guides are a great resource and very valuable for students. However, it makes difficult to visualize the dedication time of the assessment activities. It would be great to have more information about the expected dedication time of all the activities, mainly in the graded ones.

Another improvement would be the inclusion of intelligent tutoring systems for some activities. That would support immediate and automatic feedback to students and provide a testing environment where they can test their advances.

One of the concerns about the master is how the university would support new students that are not very proficient in math or programming. In that sense, some tools, like Datacamp, may help the students to improve their programming skills without taking so much workload to faculty.

The use of gamification techniques would be very useful to promote the use of formative assessment activities.

The communities of interest are good resources to promote learning among students in distance learning environments, since they provide a place to share knowledge that goes beyond subjects. The EEC believes the promotion of these communities may be a good lever to promote communication and knowledge sharing among students in the context of the current program.

Student performance is monitored and there are mechanisms to detect and address students with lower grades or with undelivered activities. The monitorization could be greatly improved by using some learning analytics techniques.

The EEC believes that the necessity of making a final written exam to evaluate some subjects may be very limitative in a distance learning environment, in which subjects are geographically dispersed.

Mark from 1 to 10 the degree of compliance for each quality indicator/criterion

1 – 4: Non-compliant

5 or 6: Partially compliant

7 or 8: Substantially compliant

9 or 10: Fully compliant

Quality indicators/criteria		1 - 10
6.1	The pedagogical planning unit for distance learning supports the distance learning unit and addresses the requirements for study materials, interactive activities and formative assessment.	9
6.2	The institution safeguards the interaction:	
6.2.1	Among students	6
6.2.2	Between students and teaching staff	10
6.2.3	Between students and study guides/material of study	10
6.3	The process and the conditions for the recruitment of teaching staff ensure that candidates have the necessary skills and experience for distance learning education.	NAP
6.4	Training, guidance and support are provided to the teaching staff through appropriate procedures.	8
6.5	Student performance monitoring mechanisms are satisfactory.	7
6.6	Adequate mentoring by the teaching staff is provided to students through established procedures.	9
6.7	The unimpeded distance learning communication between the teaching staff and the students is ensured.	10
6.8	Assessment consistency is ensured.	NAP
6.9	Teaching materials (books, manuals, scientific journals, databases) comply with the requirements provided by the distance learning education methodology and are updated regularly.	7
6.10	The programme of study has the appropriate and adequate infrastructure for the support of distance learning.	9
6.11	The supporting infrastructures are easily accessible.	9
6.12	Students are informed and trained with regards to the available educational infrastructure.	10

6.13	Procedures for systematic control and improvement of the supportive services are set.	8
6.14	Infrastructure for distance education is comparable to corresponding university infrastructure in the European Union and internationally.	10
6.15	Electronic library services are provided according to international practice in order to support the needs of the students and the teaching staff.	9
6.16	The students and the teaching staff have access to the necessary electronic sources of information, relevant to the programme, the level, and the method of teaching.	9
6.17	Students' weekly assignments are appropriate for the level of the programme.	9
6.18	Feedback on students' assignments is regular through concrete and published procedures.	8
6.19	The quality of students' final exams is ensured and evidenced.	NAP
6.20	The teaching e-learning material has been sufficiently enriched with electronic sources, updated research publications and other electronic learning resources that support students' work and learning.	8

No information about "Assessment consistency" has been gathered. It should be addressed in case that the number of classrooms for a given subject is high. Due to the current provisions of the program, it should not be a problem in the short term.

The EEC could not get information about the quality of final exams, since the programme is not running.

Please circle one of the following for:

Additional for distance learning programmes

Non-compliant

Partially compliant

Substantially compliant

Fully compliant



7. Additional for doctoral programmes (ALL ESG)

Standards

- *Specific criteria that the potential students need to meet for admission in the programme, as well as how the selection procedures are made, are defined.*
- *The following requirements of the doctoral degree programme are analysed and published:*
 - *the stages of completion*
 - *the minimum and maximum time of completing the programme*

- *the examinations*
- *the procedures for supporting and accepting the student's proposal*
- *the criteria for obtaining the Ph.D. degree*
- *Specific and clear guidelines for the writing of the proposal and the dissertation are set regarding:*
 - *the chapters that are contained*
 - *the system used for the presentation of each chapter, sub-chapters and bibliography*
 - *the minimum word limit*
 - *the binding, the cover page and the prologue pages, including the pages supporting the authenticity, originality and importance of the dissertation, as well as the reference to the committee for the final evaluation*
- *There is a plagiarism check system. Information is provided on the detection of plagiarism and the consequences in case of such misconduct.*
- *The composition, the procedure and the criteria for the formation of the advisory committee (to whom the doctoral student submits the research proposal) are determined.*
- *The composition, the procedure and the criteria for the formation of the examining committee (to whom the doctoral student defends his/her dissertation), are determined.*
- *The duties of the supervisor-chairperson and the other members of the advisory committee towards the student are determined and include:*
 - *regular meetings*
 - *reports per semester and feedback from supervisors*
 - *support for writing research papers*
 - *participation in conferences*
- *The number of doctoral students that each chairperson supervises at the same time are determined.*
- *The process of submitting the dissertation to the university library is set.*

Not Applicable

Quality indicators/criteria		1 - 10
7.1	The provision of quality doctoral studies is ensured through doctoral studies regulations, which are publicly available.	NAP
7.2	The structure and the content of a doctoral programme of study ensure the quality provision of doctoral studies.	NAP
7.3	The doctoral studies' supervisors have the necessary academic qualifications and experience for the supervision of the specific dissertations.	NAP
7.4	The number of doctoral students, under the supervision of a member of the teaching staff, enables continuous and effective feedback to the students and it complies with the European and international standards.	NAP
7.5	The research interests of academic advisors and supervisors adequately cover the thematic areas of research conducted by the doctoral students of the programme.	NAP

7.6	Research equipment, laboratories, workshops and existing bibliographic material support the programme of study.	NAP
7.7	The quality of the doctoral theses of the programme in this field is in line with international standards.	NAP
7.8	Doctoral candidates have publications in scientific journals and/ or participate in international conferences.	NAP
7.9	The institution has mechanisms and funds to support writing and attending conferences of doctoral candidates.	NAP
7.10	The candidates demonstrate skills in designing and in conducting productive self-directed research.	NAP
7.11	Candidates are aware of the ethical implications of their research and of their responsibilities as scientists.	NAP
7.12	Suitable procedures of monitoring and periodic assessment of students' research progress are set.	NAP
7.13	There is a clear policy on authorship and intellectual property.	NAP

Please circle one of the following for: NAP

Additional for doctoral programmes

Non-compliant

Partially compliant

Substantially compliant

Fully compliant

8. Additional for joint programmes (ALL ESG)

Standards

- *The joint programme is offered in accordance with legal frameworks of the relevant national higher education systems.*
- *The partner universities apply joint internal quality assurance processes.*
- *The joint programme is offered jointly, involving all cooperating universities in the design, delivery and further development of the programme.*
- *The terms and conditions of the joint programme are laid down in a cooperation agreement. The agreement in particular covers the following issues:*
 - *Denomination of the degree(s) awarded in the programme*
 - *Coordination and responsibilities of the partners involved regarding management and financial organisation, including funding, sharing of costs and income, resources for mobility of staff and students*
 - *Admission and selection procedures for students*

- *Mobility of students and teaching staff*
- *Examination regulations, student assessment methods, recognition of credits and degree awarding procedures*
- *Handling of different semester periods, if existent*
- *Aims and learning outcomes are clearly stated, including a joint syllabus, language policy, as well as an account of the intended added value of the programme.*
- *Study counselling and mobility plans are efficient and take into account the needs of different kinds of students.*

Not applicable.

Quality indicators/criteria		1 - 10
8.1	The joint study programme promotes the fulfilment of the mission and achievement of the goals of the partner universities.	NAP
8.2	The joint study programme has been developed by all the partner universities, which are also involved in its further development.	NAP
8.3	The partner universities have defined the responsibility of the parties in the common agreement.	NAP
8.4	The joint study programme conforms to the requirements and directions of national and international legislation.	NAP
8.5	The joint study programme is based on the needs of the target group and of the labour market.	NAP
8.6	Students are provided with advisory and support systems concerning learning and teaching at the partner universities.	NAP
8.7	The cooperation contract sets out the procedure for resolving disputes concerning the execution of the joint study programme, which ensures the protection of the rights of students and teaching staff.	NAP
8.8	The partner universities have agreed on how to seek feedback from students regarding the organisation and process of their study.	NAP
8.9	The partner universities ensure the economic sustainability of the joint study programme.	NAP
8.10	The degree awarded is justified by:	
	8.10.1 The learning outcomes	NAP

	8.10.2 The collaboration between/among the institutions delivering the programme	NAP
8.11	The jointness of the programme development is effective.	NAP
8.12	The students' mobility between/among the collaborative institutions provide students with rewarding experiences that facilitate employability in Europe.	NAP

Please circle one of the following for: NAP

Additional for joint programmes

Non-compliant *Partially compliant* *Substantially compliant* *Fully compliant*

D. Conclusions and final remarks

Overall, the proposed Data Science Master of Science Programme of UNIC is substantially compliant. The programme of study is timely and relevant. Its objectives and intended learning outcomes are aligned and compatible with distance learning education. The programme duration is 1,5 years with an optional thesis, leading to a lack of focus on independent study and training in the research process. The programme design is sound, informed by research and based on appropriate preparatory work.

The teaching staff includes experienced scientists in the data science domain with qualifications that meet the objectives of the programme, and collaborations with both industry and academia. Teaching is connected with research, and teaching performance is assessed via questionnaires completed by the students. The teaching team includes a good balance of genders and seniority of professors.

The university resources are adequate to support learning and the design and implementation of teaching. The classrooms and laboratories are well dimensioned and sized, the technological infrastructure is very good, the library provides a good amount of resources, both physically and virtually, and they have the tools for supporting teaching and learning, e.g., Moodle, Webex, Planet E-stream.

The distance learning methodology is appropriate for the particular program of study. The university has a unit responsible for providing pedagogical support for designing, creating, implementing and evaluating online courses. The unit addresses the requirements for study materials, interactive activities and formative assessment in accordance to international standards.

The university provides high quality support and services to students, with adequate help to students that have personal difficulties (e.g., due to the economic crisis). Students participate in internal evaluation mechanisms, but they should also have the opportunity to see the effects of

their feedback. For the admissions requirements, it seems that there are no rules regarding the programming skills needed to participate in the program.

E. Signatures of the EEC

<i>Name</i>	<i>Signature</i>
Giorgos Longinos	
Jordi Conesa i Caralt	
Konstantinos Stefanidis	
Yannis Theodoridis	
Philippe Bonnet	

Date: 6/7/2019