

Doc. 300.1.2

# Higher Education Institution's Response

**Date:** Date.

- **Higher Education Institution:**

University of Cyprus

- **Town:** Nicosia

- **Programme of study  
Name (Duration, ECTS, Cycle)**

**In Greek:**

Μάστερ στην Επιστήμη των Δεδομένων (1 1/2 έτη, 90 ECTS, Μεταπτυχιακό πρόγραμμα)

**In English:**

Magister Scientiae in Data Science (1 1/2 years, 90 ECTS, Postgraduate Program)

- **Language(s) of instruction:** English

- **Programme's status:**

New programme: Yes

Currently operating: No



**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 to 2019” [N. 136 (I)/2015 to N. 35(I)/2019].**

## A. Guidelines on content and structure of the report

- *The Higher Education Institution (HEI) based on the External Evaluation Committee's (EEC's) evaluation report (Doc.300.1.1) must justify whether actions have been taken in improving the quality of the programme of study in each assessment area.*
- *In particular, under each assessment area, the HEI must respond on, without changing the format of the report:*
  - *the findings, strengths, areas of improvement and recommendations of the EEC*
  - *the deficiencies noted under the quality indicators (criteria)*
  - *the conclusions and final remarks noted by the EEC*
- *The HEI's response must follow below the EEC's comments, which must be copied from the external evaluation report (Doc. 300.1.1).*
- *In case of annexes, those should be attached and sent on a separate document.*

*We refer to the Report of the external evaluation committee for the evaluation-accreditation of the program of study: 'Master of Science in Data Science', which was prepared by the members of the External Evaluation Committee (EEC) on September 8, 2020. We would like to thank the EEC members for their professional and thorough work during the online evaluation of the MSc Data Science programme and their report.*

*We would also like to express our appreciation for the professional and fruitful approach with which they conducted their evaluation.*

*The EEC report is extremely positive. We are looking forward to the accreditation of the programme based on this report. We do appreciate the committee's recommendations for improvement, which will enhance the quality of our program and we will be addressing those in the corresponding section of this response. In the following sections we break down the comments and suggestions of the committee and we provide our comments (if any) and the actions taken in order to address the comments. In order to simplify and make this response report easier to read, we state all positive comments for each section together and then we respond to the constructive feedback of the committee.*

## 1. Study programme and study programme's design and development (ESG 1.1, 1.2, 1.8, 1.9)

### Findings

The study programme is well designed, and it allows for a specialisation in different sub-areas by three specific tracks. The Capstone project links the students with practice, and these connections to the industry can be very valuable once the students have finished their studies. The targeted qualification aims to follow the latest research lines. The content of the program and the three education tracks allow for a certain flexibility for students and enables adaptation with respect to the needs of industry. Lecturers are already cooperating in different projects and thus well connected. It can thus be assumed that the course contents are coherent and coordinated as well. Students with a variety of backgrounds are admitted to the programme. Some students might require additional courses or support. There are no clear criteria to decide which additional activities are required for a given student. There are no quality assurance processes to evaluate how adequate additional activities are and to adapt them in time. Quality assurance of the courses is mainly based on questionnaires filled in by students. Based on the feedback, teachers improve materials continuously. However, the process as described lacks transparency. Feedback from quality assurance questionnaires should be centrally collected and analysed, and a summary should be made available to staff and students. Students should get feedback to their assessments. An online procedure would ensure a more unified evaluation and more transparency. The programme aims to combine theory with practice. The theoretical background is put into the lectures, and the practical part consists of programming with real data examples and practical training with problems and tasks in collaboration with companies. However, there is no possibility at the moment for students to complete their study with a Master thesis. This is a problem if a student is interested in a PhD. Drop-out rates are very low at University of Cyprus. The reason for that is not obvious, but it seems to be related to a good pre-selection of the students and to strong support. Moreover, there are different evaluation measures to pass a course; this variety provides more detailed feedback to the students and the possibility to improve potential weaknesses. The study programme is in English, which makes it easy for international students to participate.

1.1 Policy for quality assurance: Partially compliant; 1.2 Design, approval, on-going monitoring and review: Compliant; 1.3 Public information: Compliant; 1.4 Information management: Compliant

### Strengths

The study programme is very well designed.

The Capstone project links the students with practice and external stakeholders.

Lecturers are already cooperating in different projects and thus well connected.

The drop-out rate is very low.

The study programme is in English.

### Areas of improvement and recommendations

The EEC recommends that feedback from student questionnaires should be centrally collected, analysed and shared with staff and students.

The EEC recommends that quality assurance processes should be precisely defined to ensure the evolution of the programme and its adequation with student and stakeholder needs.

The EEC suggests the addition of a thesis to the programme.

#### UCY Response:

*The central idea of a quality control system is the definition of what determines academic quality, how this can be legitimately tested and by whom, as well as the description of the cyclical follow-up for the observed quality.*

*The quality assurance processes of the programme will comply with the following requirements: 1) will be cyclical in nature, and it will include all phases of the quality cycle (plan, do, check, act). Quality systems in higher education are generally based on the Plan-Do-Check-Act (PDCA) cycle. 2) will require periodical and systematic academic evaluations from the programme management committee. 3) will enhance transparency and accountability*

*The program management committee will be responsible for the quality assurance of the program. Hence and after running the designed program, a checking mechanism will be in place in order to collect feedback about the outcomes of program compared to the initial ones as well as the needs of the market, new research developments etc. Data collection includes:*

- 1. online evaluations of courses and the curriculum as a whole. Specifically, every semester we will run standard teaching evaluations, as imposed by the University regulations. Evaluations cannot be distributed to students because of GDPR regulations.*
- 2. quality assurance questionnaires (online surveys) to students, teachers, graduates, advisory board members and future employers so as to receive feedback for the programme.*
- 3. KPIs and other statistics related to the program i.e. drop out rates, courses failures, average grades.*

*The programme management committee will examine and analyse the collected information in order to take actions for improving the quality of the program accordingly. An annual meeting regarding quality assurance will take place after the Spring Semester, in order to be enough time for the implementation of any actions, well before the next Fall Semester.*

*In order to enhance transparency a summary of findings should be made available to staff and students, yearly. The quality loop will be followed up by an external evaluation for accreditation, every five years.*

*The admission procedure for postgraduate students at the University of Cyprus takes place through the Graduate School, which announces available programs and positions. In addition to announcing the number of positions available in each field of study and the application procedure, the eligibility criteria for candidates are also mentioned, as well as other required documents that must be attached to the application:*

- Bachelor degree from an accredited Higher Education Institution with a GPA of at least 6.5/10.*
- Previous university education in a suitable subject (academic background, including degrees in Statistics, Computer Science, Mathematics, Engineering, Economics, Business, Physics) and grades of relevant degrees.*
- Letters of recommendation.*

#### *Additional academic criteria:*

- Successful completion of courses in Probability, Statistics or Econometrics and fundamental Mathematical courses (e.g. basic calculus, linear algebra, etc)*
- Intro to Computer Science (or an equivalent programming course in Python, R, etc)*

*Candidates submit an application consisting of (A) Latest Academic transcript (B) two (2) letters of recommendation (c) a curriculum vitae; and (d) a personal statement, outlining his/her interests.*

*The Data Science Programme will receive postgraduate students each year, on dates and with procedures determined by the University. Applications will be submitted to the Secretariat of the Graduate School and examined by a six-member Interdepartmental Board, consisting ex officio of the three Program Directors, plus three other academics (one from each department) that are connected to the Data Science Program (e.g. they teach courses or supervise students' projects). The Interdepartmental Board is responsible for student applications processing, student selection, and conducting face to face interviews with applicants. Candidates will be evaluated according to their academic*

criteria and interview performance by the members of the Board. Admission will be offered to the candidates with the cumulative highest performance following a written notification to which they have to reply within a period of two weeks. Candidates who will not succeed will be also notified via email.

Although we believe that most of the applicants will meet these requirements, we will provide to students that might require additional support, extra-curricular activities and additional teaching material so as to guarantee a smooth transition to the programme. There is also the possibility to offer conditional acceptance to the students, who do not meet all the requirements., which means that they should attend one or two undergraduate courses (for instance programming or statistics).

Following the recommendation of the committee about the thesis option, we note that such an option will enhance the programme considerably by allowing exceptional students to engage in research. We will incorporate this suggestion as follows. We will offer an optional research project for the students that would like to continue their studies and be enrolled in a PhD programme. This option will be made available only to exceptional students who have clearly demonstrated research interest during their studies. The decision of offering this option to students will be solely based on the Interdepartmental Board provided appropriate supervisors have been found. When the program is launched, the faculty advisors will be encouraging students who wish to follow an academic career or work in R&D to opt for the thesis option. Specifically, the research project option will be available to the students who want to pursue Ph.D. studies in any area covered by the programme. Such students need to satisfy the respective departmental Ph.D. admission criteria. The research project option will replace a restricted elective course.

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

### Findings

A short description of the situation in the Higher Education Institution (HEI), based on elements from the application for external evaluation and on findings from the onsite visit. The faculty members from the three departments involved in the programme have a track record of research at the highest international level. As a result, teaching is based on state-of-the-art research. The process of teaching and learning also corresponds to international standards. Practical training is organized through the two-parts Capstone project. Through this project, students have the opportunity to be actively involved with problems defined by external stakeholders. A key issue for this programme is that many courses are shared with existing programmes. The needs and interests of data science students must be addressed specifically. The EEC recommends that specific tutoring is introduced in those classes for data science students. This requires a dedicated budget. For the teaching process, the faculty receives support by The University of Cyprus Center for Teaching and Learning through workshops and seminars. Both faculty and students mentioned that the drop-out rate is low as a result of the high ratio of teachers to students and of the care taken to accommodate mitigating circumstances.

2.1 Process of teaching and learning and student- centred teaching methodology: Compliant; 2.2 Practical training: Compliant; 2.3 Student assessment: Compliant

### Strengths

Teaching is based on high-quality research in the three departments involved in the programme.

The central role of the capstone project favours student-centred learning.

The drop-out rate is low at University of Cyprus showing a culture of taking mitigating circumstances into account.

### Areas of improvement and recommendations

The EEC recommends that a budget should be allocated upfront to fund teaching assistants tutoring data science students in the context of classes shared with existing programmes.

**UCY Response:** We will communicate as soon as possible the above recommendation to the University Management, and more specifically to a) the Office of the Rector, b) the Office of the Vice-Rector of International Affairs Finance and Administration for their consideration. Furthermore, we will request from the Graduate School of the University of Cyprus to establish a procedure through which multi-departmental MSc programmes like this one, would be able

to draft budget proposals through the respective departments and the school, to earmark funding for teaching activities, visiting professors, organizing colloquiums etc.

The following budget proposal has been submitted to the University's Rectorate Council so as the program ensures that has all the needed resources.

#### Academic Personnel

Instructors (Special Scientists): €3,700 x 6 = €22,200

Teaching Assistants for the labs: €1,710 x 3 = €5,130

#### Other Costs

Web site and preparation (only for the first year):	€4,000
Teaching material preparation (video, montage for mixed mode learning)	€6,000 (€3,000 per semester)
HPC Server with GPU for deep learning and data science applications (only for the first year) (the server will be installed in the new HPC center of UCY)	€30,000
Advertising (branding) / Internet / Social media	€9,500
Promotion Events (e.g. open days)	€3,700
APIs licences	€3,000

### 3. Teaching Staff (ESG 1.5)

#### Findings

The academic faculty instructors are leading researchers, publishing in top international journals across all three disciplines (Business, Mathematics, Computer Science), highly appreciated world-wide with a lot of citations under their name – given their respective age – and with their alma mater most coming from top North American institutions including MIT, Stanford and Princeton (for their doctoral studies). Other instructors are highly competent, resulting in a useful and effective mix of theory and practice. There is a good spread in the professorial ranks involved. There is some gender imbalance that could be alleviated over the years through respective hiring and involvement in the programme of more women. While faculties involved in the programme have worked together, they have not published much together, especially in business journals. The synergy across the three departments could be strengthened by joint publications in leading journals or conferences in business, computer science and mathematics/statistics.

3.1 Teaching staff recruitment and development: Compliant; 3.2 Teaching staff number and status: Compliant; 3.3 Synergies of teaching and research: Compliant

#### Strengths

The academic faculty instructors are leading researchers with excellent track records. There is a good mix of faculty with diverse and synergetic interests across the three disciplines.



#### Areas of improvement and recommendations

The EEC recommends that gender imbalance in the teaching staff should be addressed.

The EEC suggests to strengthen synergies across the three departments through joint publications.

**UCY Response:** *We fully agree with both recommendations. Our goal is to make the Data Science Programme a benchmark programme within the University of Cyprus on promoting gender diversity. Towards this goal, we will form a subcommittee within the advisory board that will be tasked with strategically engaging in efforts and recommending actions to the inter-departmental board to promote Gender Diversity within the Programme. The inter-departmental board will assure that the subcommittee has the resources and information required to fulfil its mission. Also, the University of Cyprus encourages women in science as a part of the agenda that promotes gender equality. We expect that the gender imbalance could be alleviated over the years through respective hiring and involvement in the programme of more female faculty. To further enhance gender balance, we will pay particular attention to gender balance in the branding and promotion of the program. Regarding the synergies, although we have already established synergies across the three departments (i.e., R&D projects, joint supervision PhD students), we expect that the Data Science programme will play a catalytic role in strengthening synergies and publishing papers in top-tier journals and conferences.*

## 4. Students

(ESG 1.4, 1.6, 1.7)

### Findings

Student admission requirements are defined, but the EEC recommends that the admission criteria are more precisely defined. For example, a “Bachelor degree of a recognised university” does not say which Bachelor degree, and the definition of “recognised” is also not clear. Also, “Previous university education in a suitable subject” is unclear, because “suitable” may be subjective. The EEC recommends that a procedure for admission of (international) student applications with a Bachelor of 180 ECTS should be defined. The admission committee consists of experts from all three departments involved in the programme, which ensures an appropriate level of knowledge of the admitted students. There is great enthusiasm from the responsible scientific staff and lecturers to install the program, and a lot of flexibility to mentor the students. The programme takes care of student progression. Many lectures are accompanied by practical tasks and exercises which serve as a feedback to both students and teachers. There are LOIs with many other institutions and companies which allow for a knowledge exchange, in particular in the frame of the Capstone project. The programme allows for a specialisation in three disciplines. However, it is not clear if the specialisation track will be mentioned in the final certificate. This may be important information to future employers as the tracks are focusing on quite different subjects.

4.1 Student admission, processes and criteria: Partially compliant; 4.2 Student progression: Compliant; 4.3 Student recognition: Compliant; 4.4 Student certification: Partially compliant

### Strengths

The admission committee consists of experts from all three departments involved in the programme.

There is great enthusiasm from the responsible scientific staff and lecturers to install the program, and a lot of flexibility to mentor the students.

Exercises, practical training and the Capstone project require many teaching resources which are made available to the students in this programme.

### Areas of improvement and recommendations

The EEC recommends that a list of suitable Bachelor studies should be defined as admission requirement, and that a list of additional mandatory subjects should be defined for those students who need them, based on their background.

The EEC recommends that applicants who are not accepted in the programme should be provided with feedback in order to guarantee a transparent procedure.



#### UCY Response:

We envision that successful applicants to the master programme of Data Science will have Bachelor degrees in Science, Mathematics, Engineering, or Business, provided that they satisfy the following requirements:

1. Successful completion of introductory courses in Probability, Statistics or Econometrics and fundamental Mathematical courses (basic calculus, linear algebra)
2. Intro to Computer Science (or an equivalent programming course in Python, R, etc)
3. A satisfactory personal interview

Students who will not be allowed to enrol will be given constructive feedback for their unsuccessful application. They will be provided with recommended courses of action so that they can reapply to the programme.

## 5. Resources (ESG 1.6)

### Findings

The overall resources and support of the studies are well designed and of very high quality. The support levels and provision of the very successful MBA programme are a model for this new cross-department MSc programme. In order to replicate the success of the MBA, the EEC recommends that administrative support is provided to this new programme from the start. The EEC recommends that there should be support for tutorials so as to support the MSc in the Data science cohort when attending lectures jointly with other MSc cohorts from other programmes. There should be a budget for this support (as mentioned in Section 2). The programme involves three departments with different cultures and regulations. The EEC recommends that the programme directors manage the inevitable cross-department discrepancies so that this diversity enriches the programme and does not result in an incoherent experience for students.

5.1 Teaching and Learning resources: Compliant; 5.2 Physical resources: Compliant; 5.3 Human support resources: Compliant; 5.4 Student support: Compliant

### Strengths

The MBA programme is a successful model for this new programme.

### Areas of improvement and recommendations

The EEC recommends that there is a budget for administrative support for this new programme from the start.

The EEC recommends that the programme directors manage cross-department discrepancies to guarantee a coherent experience for students.

**UCY Response:** *We fully agree with both recommendations. The programme directors will be fully committed so as to address any cross-department discrepancies and guarantee a coherent experience for students. Biweekly meetings will take place so as to evaluate the progress of the programme. Also, in every year, the programme directors will organize a meeting where students will participate and suggest methods to improve the programme, discuss their problems, etc. In addition, we will have 2 student representatives, as observers in the programme's council. Last, we would like to note that students at the University of Cyprus take an active role in academic decisions including the development of the learning process. This is achieved through the student participation to Departmental councils. Elected student representatives are voting members to Departmental decisions; students from the MSc in Data Science will be able to participate in the department councils.*

*Regarding the administrative support, we will communicate the above recommendation to the University Management, and more specifically to a) the Office of the Rector, b) the Office of the Vice-Rector of International Affairs Finance and Administration for their consideration. Furthermore, we will request from the Graduate School of*

the University of Cyprus to establish a procedure through which multi-departmental MSc programmes like this one, would be able to draft budget proposals through the respective departments and the school, to earmark funding for administrative assistance, promotion etc. The following budget proposal has been submitted to the University's Rectorate Council so as the program ensures that has all the needed resources.

#### Administration Personnel

Web & social media admin: €4104 (€342 per month – for 12 months – postgraduate student)

Secretarial support: € 5806 (as overtime to the office staff: 6 hours per week for €24.19/hour for 40 weeks)

IT support: €3870 (as overtime to the IT support staff: 4 hours per week for €24.19/hour for 40 weeks)

### **6. Additional for distance learning programmes (ALL ESG)**

Not applicable

### **7. Additional for doctoral programmes (ALL ESG)**

Not applicable

### **8. Additional for joint programmes (ALL ESG)**

Not applicable

## **B. Conclusions and final remarks**

Overall, the EEC finds the proposed programme compliant. The programme is timely and relevant. Its objectives and intended learning outcomes are aligned. The programme design is sound and well prepared.

The teaching staff includes leading scientists in computer science, mathematics/statistics and business administration. Teaching is connected with high-quality research. Teaching performance is assessed via questionnaires completed by the students.

The university resources are adequate to support learning and the design and implementation of teaching.

The university provides high quality support and services to students, with adequate help to students that have personal difficulties. Students participate in internal evaluation mechanisms, but they should also have the opportunity to see the effects of their feedback.

The EEC recommends that a budget should be allocated upfront to fund administrative support as well as teaching assistants tutoring data science students in the context of classes shared with existing programmes.

The EEC recommends that a list of suitable Bachelor studies should be defined as admission requirement, and that a list of additional mandatory subjects should be defined for those students who need them, based on their background.

Furthermore, the EEC recommends that:

- feedback from student questionnaires should be centrally collected, analysed and shared with staff and students.

**UCY Response:** *Please see our response in section 1.*

- quality assurance processes should be precisely defined to ensure the evolution of the programme and its adequation with student and stakeholder needs.

**UCY Response:** *Please see our response in section 1.*



- a thesis can be added to the programme.

**UCY Response:** *Please see our response in section 1.*

- applicants who are not accepted in the programme should be provided with feedback in order to guarantee a transparent procedure.

**UCY Response:** *Please see our response in sections 1.*

- the programme directors manage cross-department discrepancies to guarantee a coherent experience for students.

**UCY Response:** *Please see our response in section 5.*



### C. Higher Education Institution academic representatives

<i>Name</i>	<i>Position</i>	<i>Signature</i>
Sergios Agapiou	Assistant Professor	
Anastassia Baxevani	Associate Professor	
Marios Dikaiakos	Professor	
Konstantinos Fokianos	Professor	
Panos Markopoulos	Assistant Professor	
Christos Nicolaides	Lecturer	
George Pallis	Associate Professor	

**Date:** 6 October 2020

