THE CYPRUS INSTITUTE
RESEARCH·TECHNOLOGY·INNOVATION

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GRADUATE SCHOOL/OUT/052018/4648

May 10, 2018

To: The Cyprus Agency for Quality Assurance and Accreditation in Higher Education

Subject: Response to External Evaluation Report for the new Program of Study- Master's in Simulation and Data Science

Dear CYQAA Council members,

Below please find our response to the report of the External Evaluation Committee prepared upon their on-site visit to The Cyprus Institute on March 26, 2018. We would like to thank the Committee for their constructive comments and suggestions, which helped us to improve the structure and content of the program. All the points of the report that warranted attention are presented in italicized fonts below, each followed by our response.

Yours sincerely

Costas N. Papanicolas

President of The Cyprus Institute

1. EFFECTIVENESS OF TEACHING WORK- AVAILABLE RESOURCES

1.1 Organization of Teaching Work

1. "The program is currently specified as a 13-month program, as evidenced from the stated start and end dates. It is necessary that the program is extended to 14 months by allowing additional weeks for completion of the thesis."

Response: The program has been extended to 14 months as indicated by the Committee, by allowing additional weeks for completion of the thesis. The updated academic calendar for the academic year 2018-19 is presented in Annex I.

2. "Plans should be in place for ensuring quality teaching in light of the expected mixed backgrounds of students admitted to the program. This issue can be handled with the initial intake of <10 students, but will become more difficult when the number of students on the program grows."

Response: We appreciate the concerns of the Committee and indeed we plan to admit only a small number of students in the first two academic years (<10 students per year). In addition, at the start of each course, we plan to offer preparatory training in the form of supportive tutoring, aimed at bringing candidates to the adequate level in terms of background knowledge.

3. "Plagiarism and mentoring are not well addressed in the documentation."

Response: With regards to plagiarism, we are currently in the process of acquiring plagiarism detection software. The relevant quote can be found in Annex II.

All new students will be assigned a Mentor from the beginning of their programs to provide general support (see details in Annex III). Students will also be assigned a Supervisor who will provide guidance and support specifically for the thesis. This information is included in our Program Handbook.

1.3 Teaching Personnel

4. "There is a shortage of personnel in data science which must be addressed. Consequently, there is an imbalance between simulation science and data science in the program. We expect that this will be rectified, given the hiring plans that are in place."

Response: In response to this criticism, we readily proceeded with already undertaken plans in announcing a new faculty position in the area of data science and its applications. For reference, please see: https://jobboard.cyi.ac.cy/?q=node/2473. As specified in the call, applications are open for appointment at any academic rank at the CyI commensurate to the applicants' experience and international standing, with a preference for Associate Professor or (full) Professor.

In addition, the Institute has been recently (after the Committee visit) awarded a prestigious ERA Chair grant from the EU Horizon 2020 in the area of "Modelling and

Simulation for Engineering Applications" (SimEA). This prestigious grant will significantly expand the research and educational portfolio of the Institute and its Computational Sciences and Technology Research Center that is leading this Masters program, by establishing a team of outstanding researchers led by a Professor of international calibre in computation-based engineering. It is expected that this position will be announced soon and be filled within the coming academic year.

2. PROGRAM OF STUDY AND HIGHER EDUCATION QUALIFICATIONS

2.2 Structure and Content of the Program of studies

5. *"Simulation science is well covered, but data science is somewhat weak. There is some unnecessary overlap between the content of courses. Some foundations are missing from the program." … "The 10 ECTS courses seem light in term of student contact hours. We propose that contact hours are increased by at least 1 hour per week for each 10 ECTS course..." … "Care should be taken to minimise the overlap between courses. For example, the mandatory course 404 overlaps strongly with some other courses. We suggest that the content of this course is reconsidered. Consideration should be given to introducing some more foundational material in the program, for instance from statistics."*

Response: In response to the aforementioned recommendations of the committee we increased the contact hours from 3 to 4 reflecting the 10 ECTS that each course is credited with.

In addition, to strengthen the data science elements of the degree, along with introducing foundational material in the program such as statistics, we have introduced a new course: Fundamentals of Data Science and Statistics - SDS 403. The course introduces students to (i) foundational knowledge in statistics for data science, while (ii) also providing a range of practical and applied skills (data programming, big data analysis and introduction to cluster-computing frameworks). The course has replaced the mandatory course SDS 404 (Simulation and Data Science Applications), thus addressing the reviewer comments that are related to a potential overlap of the course material with some of the other courses in the program. The Machine Learning and Data Mining course (previously SDS 403, now SDS 404) remains mostly as is, with some introductory/practical content moved to the Fundamentals of Data Science and Statistics course and is further enriched with scientific applications of data science and machine learning. The course title is now Machine Learning and its Applications (SDS 404). The new courses' short descriptions can be found in Annex IV.

4. ADMINISTRATION SERVICES, STUDENT WELFARE AND SUPPORT OF TEACHING WORK

4.3 Financial Resources

6. *"Financial resources are sufficient to cover the delivery of the program. We query if the level of fees proposed is unnecessarily high, in light of projected revenue after year 3 of the program. Consideration should be given to increasing the financial support to students in order to attract top-level students to the program.*

Response: As we did for our newly established and accredited Master's program in Environmental Sciences, we plan to: (a) offer scholarships to top applicants in this program, which fully or partially cover the tuition fees, and (b) offer an up to 40% waiver in tuition fees for at least the first two years of the program to ensure its successful commencement.

ANNEX I

Academic Calendar *(Indicative example for 2018-2019)*

FALL SEMESTER (TERM 1)	
16 weeks 14 weeks teaching, 1 week revision, 1 week exam	
September 10 (2nd Monday), 2018	Beginning First Slot
October 26, 2018	End First Slot
October 29 - November 2, 2018	Revision Week
November 5, 2018	Beginning Second Slot
December 21, 2018	End Second Slot
December 24, 2018- January 4, 2019	Winter Break
January 7-11, 2019	Evaluation - Examination Period for First Term
January 11, 2019	End of Fall Semester (TERM 1)

SPRING SEMESTER (TERM 2)	
16 weeks 14 weeks teaching, 1 week revision, 1 week exam	
January 14, 2019	Beginning First Slot
March 1, 2019	End First Slot
March 4-8, 2019	Revision Week
March 11, 2019	Beginning Second Slot
April 25, 2019	End Second Slot
April 26-May 10, 2019	Spring Break
May 13-17, 2019	Evaluation - Examination Period for Second Term
May 17, 2019	End of Spring Semester (TERM 2)

SUMMER TERM (TERM 3)	
14 Weeks 14 weeks research project	
May 20, 2019	Beginning of Summer Term (TERM 3)
August 12-16, 2019	Summer Break
August 30, 2019	End of Summer Term (TERM 3)

FALL SEMESTER (TERM 4)	
10 Weeks 8 weeks research project, 1 week preparation for viva, 1 week viva	
September 9, 2019	Beginning of Fall Semester (TERM 4)
November 4-8, 2019	Viva Preparation Week
November 11-15, 2019	Viva
November 15, 2019	End of Fall Semester (TERM 4)

ΕΜΠΟΡΙΑ ΚΑΙ ΥΠΗΡΕΣΙΕΣ ΕΝΤΥΠΗΣ & ΗΛΕΚΤΡΟΝΙΚΗΣ ΠΛΗΡΟΦΟΡΗΣΗΣ
& ΣΥΣΤΗΜΑΤΩΝ ΠΛΗΡΟΦΟΡΙΚΗΣ

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Προς: The Cyprus Institute

Υπόψη: κ. Κωνσταντίνου Κλεοβούλου

Αθήνα, 16 Απριλίου 2018

Θέμα: Προμήθεια συνδρομής στο Turnitin εκ μέρους του The Cyprus Institute

Αξιότιμε κύριε Κλεοβούλου,

Σε συνέχεια του ενδιαφέροντός σας για την προμήθεια συνδρομής στο **Turnitin**, η εταιρεία μας είναι στην ευχάριστη θέση να σας καταθέσει την προσφορά της για μια τριετή συνδρομή για το The Cyprus Institute.

Προσφορά Turnitin (Originality Check only)* για 100 φοιτητές

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Στην παραπάνω τιμή δεν περιλαμβάνεται ο ΦΠΑ 24%

* (Originality Check, Translated Matching, Integrations)

Η παρούσα προσφορά ισχύει έως τις 16/6/2018.

Έκδοση και εξόφληση τιμολογίων

Η τιμολόγηση από την εταιρία γίνεται με την έκδοση ενός συνολικού τιμολογίου με την έναρξη της συνδρομής ανά έτος.
Η εξόφληση γίνεται υποχρεωτικά εφ' άπαξ εντός 30 ημερών από την ημερομηνία έναρξης της συνδρομής ανά έτος. Η εξόφληση μπορεί να γίνει με κατάθεση σε τραπεζικό μας λογαριασμό, είτε με έκδοση τραπεζικής επιταγής (όχι μεταχρονολογημένης).

Είμαστε στη διάθεσή σας για οποιαδήποτε διευκρίνιση και ευελπιστούμε να έχουμε τη χαρά να συνεργαστούμε με το The Cyprus Institute.

Με τιμή,

Για την InterOPTICS A.E.E.

Γιώργος Αναστασάκης

Υπεύθυνος Πωλήσεων Turnitin

The Cyprus Institute 16/4/2018 TII

Academic and Personal Mentoring for Graduate Students

CyI is committed to providing all students with the academic guidance and personal support that they need to flourish as members of our active learning and research community. Every graduate student will be assigned a competent member of the staff, a Mentor, who will provide constructive academic and personal development guidance and support. At the beginning of the year, students will be provided with the name and contact information of their Mentor, along with the date of their first meeting. It is the students' responsibility to stay in touch with their Mentors and to be proactive in engaging them throughout the duration of their program.

Support related to the Program

The Mentor supports students in focusing on matters of academic progression such as course choices, review of progression at end of each term, and guidance on relevant academic support. It is the students' responsibility to make regular contact with their Mentor to confirm a time to discuss academic progression matters.

Support related to Courses

The Course Handbook includes course-specific guidance on reading, examination and coursework elements. The Handbook also provides clear guidance and information on who to contact for support related to courses (the course instructor or course leader if more than one instructor is teaching a course). If students have questions or issues that cannot be addressed by contacting the course instructor, then the issue should be discussed with their Mentor. If the issue cannot be resolved, then the Program Coordinator who undertakes a full overview of the program should be contacted.

Support related to pastoral/welfare issues

If students experience any personal difficulties that affect their studies, their Mentor should be their first point of contact. If the problem cannot be resolved with the Mentor, then the Program Coordinator should be contacted. Personal matters and information will be treated confidentially and acted upon as quickly as possible.

Course Title	**Fundamentals of Data Science and Statistics**				
Course Code	SDS 403				
Course Type	Mandatory				
Level	Master's				
Year / Semester	1st / 2nd				
Teacher's Name	Mihalis Nicolaou				
ECTS	10	Lectures / week	1 (2h)	Laboratories / week	1 (2h)
Course Purpose and Objectives	Introduce students to data science, big data analysis and statistics. This includes a focus on statistical methods for data scientists, including random variables, probability theory, continuous and discrete distributions, inference, estimation, hypothesis testing and statistical significance. To develop a set of practical skills and tools in terms visualizing, exploring, storing and processing data, and an introduction to cluster-computing frameworks (Hadoop, Spark).				
Learning Outcomes	By the end of the course, the students will have a good grasp on statistical knowledge related to data science, and be able to apply this knowledge to data using modern tools and libraries. The students will also be able to perform exploratory data analysis, as well as introductory techniques for visualization. Students will also be familiarized with cluster-computing frameworks, and be able to apply and explain programming models such as MapReduce.				
Prerequisites	None		Required	None	
Course Content	**Introduction to Statistics and Statistical Learning:** Linear algebra review; statistics for data science; probability, random variables, correlation and causation, common probability distributions. Statistical inference; estimation, hypothesis testing and statistical significance; introduction to Bayesian methods, regression, classification and time-series analysis. **Data Programming and Big Data Analysis**: numerical tools and libraries for managing and analysing data of various types. Exploratory data analysis and visualization. Data structures for manipulating and storing data. Data collection, standardization and analysis; introduction to cluster-computing frameworks				

	(Hadoop, Spark).
Teaching Methodology	Lectures, Exercises
Bibliography	C. Heumann, M. Schomaker, *"Introduction to Statistics and Data Analysis"*. Springer, 2016.
	Haslwanter T., *"An Introduction to Statistics with Python"*, Springer, 2016.
	J.W. Tukey. Exploratory Data Analysis. Addison-Wesley, 1977.
	Karau, H., Konwinski, A., Wendell, P., & Zaharia, M. Learning Spark: lightning-fast big data analysis. O'Reilly Media, Inc., 2015.
	White, T. Hadoop: The definitive guide. O'Reilly Media, Inc.
	Gkoulalas-Divanis, A., & Labbi, A. (Eds). Large-Scale Data Analytics. Springer, 2012.
Assessment	25% coursework, 75% exam
Language	English

Course Title	**Machine Learning and its Applications**				
Course Code	SDS 404				
Course Type	Mandatory				
Level	Master's				
Year / Semester	1st / 2nd				
Teacher's Name	George Christophides/Charalambos Chrysostomou				
ECTS	10	Lectures / week	1 (2h)	Laboratories / week	1 (2h)
Course Purpose and Objectives	The aim of this course is to provide a broad introduction to students on both theoretical as well as practical concepts in machine learning, data mining and pattern recognition. Topics include fundamental machine learning concepts and algorithms, such as supervised learning (parametric and non-parametric algorithms, classification and regression, discriminative and generative learning), unsupervised learning (clustering, dimensionality reduction, data imputation), and learning theory (bias-variance tradeoff, curse of dimensionality). The course will also include an introduction to deep learning, practical advice for designing machine learning systems, as well as an overview				

	of modern scientific applications of machine learning and data mining (e.g., classification of omics data and applications in biology, object detection and human behaviour analysis, weather forecasting).
Learning Outcomes	By the end of the course, students will be able to demonstrate a critical understanding of fundamental concepts in machine learning and data mining, as well as gain practical skills in applications related to a variety of scientific application domains. Students will be familiarized with a set of core algorithms to machine learning and data mining, be able to select, implement and apply the appropriate algorithms based on problems, applications and datasets, and be familiarized with extracting appropriate feature representations and rigorous evaluation of algorithm performance.
Prerequisites	SDS 401, SDS 402, SDS 403 Required None
Course Content	**Introduction to Machine Learning and Data Mining**: Supervised learning (parametric and non-parametric algorithms, classification and regression, discriminative and generative learning), unsupervised learning (clustering, dimensionality reduction, density estimation, data imputation), learning theory (bias-variance tradeoff, curse of dimensionality). Exploration of linear and non-linear learning (kernel methods, neural networks). Introduction to reinforcement learning. Introduction to deep learning (convolutional, recurrent networks, adversarial learning). **Machine Learning Applications:** Practical advice for designing machine learning systems (e.g., for big data, combining heterogeneous data sources, on-line learning). Students will carry out practical data-driven projects, utilizing data science tools in scientific applications such as biology (classification of omics data and sequence analysis), computer vision (human sensing, facial image analysis, object detection), physics (Ising model phase transitions), energy (solar forecasting) and weather modelling (daily rainfall, weather forecasting).
Teaching Methodology	Lectures, Exercises
Bibliography	C. Bishop, *"Pattern Recognition and Machine Learning"*, ISBN: 978-0-387-31073-2, 2009. K. Murphy *"Machine Learning: a Probabilistic Perspective"*, MIT Press, 2012. I. Goodfellow, Y. Bengio, A. Courville *"Deep Learning"*, MIT Press, 2017 G. James, D. Witten, T. Hastie and R. Tibshirani, *"An Introduction to Statistical Learning"*, ISBN-13: 978-1461471370, 2017

	I. Witten, E. Frank, M. Hall, *"Data Mining: Practical Machine Learning Tools and Techniques"*, ISBN-13: 978-0123748560, 1999
Assessment	25% coursework and 75% exam
Language	English