

Doc. 300.3.1/1

Date: March 9, 2022

External Evaluation Report

(Programmatic within the framework of Departmental Evaluation)

- **Higher Education Institution:**
University of Cyprus
- **Town:** Nicosia
- **School/Faculty:** Faculty of Pure and Applied Sciences
- **Department:** Mathematics and Statistics
- **Programme(s) of study - Name (Duration, ECTS, Cycle)**
Programme 1 – PhD Stat.
In Greek:
Διδακτορικό στη Στατιστική
In English:
PhD in Statistics
Language(s) of instruction: Greek
- **Programme 2 – MMS**
In Greek:
Μάστερ στις Μαθηματικές Επιστήμες
In English:
Master in Mathematical Sciences
Language(s) of instruction: Greek
- **Programme 3 – PhD Math.**
In Greek:
Διδακτορικό στα Μαθηματικά
In English:
PhD in Mathematics
Language(s) of instruction: Greek



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 2021 [L.136(I)/2015 – L.132(I)/2021].

A. Introduction

The Cyprus Agency for Quality Assurance and Accreditation in Higher Education (CYQAA) charged the External Evaluation Committee (EEC) to conduct a remote external evaluation-accreditation of the following programmes of study: PhD in Statistics, Master in Mathematical Sciences and PhD in Mathematics offered by the Department of Mathematics and Statistics of the University of Cyprus.

The process of evaluation included three phases:

1. Before the virtual site visit, the members of the EEC studied the provided reports and material. The EEC had a preliminary remote meeting on February 28 to discuss the evaluation process, the provided material and to prepare for the virtual site visit. The EEC also had a virtual tour of the university, the department and its facilities.
2. During a two-day virtual site visit on March 1 and 2, the EEC discussed the programmes with the head of the department, teaching staff, students and graduates. There was an open and lively discussion of strengths, weaknesses, threats and opportunities and the EEC received answers to all open questions. The meetings turned out to be very helpful to gain additional insights about the strategy, operation and future plans of the department, overall and in particular with respect to the three programmes.

The visit on March 1 included the following main points:

- Meeting with the Vice Rector for Academic Affairs;
- Meeting with the Head of the department;
- Discussion of the Master in Mathematical Sciences with relevant committee;
- Meeting with teaching staff;
- Meetings with administrative staff;
- Meeting with students and graduates;
- Live stream of a course.

The visit on March 2 included the following main points:

- Discussion of the PhD in Mathematics with relevant committee;
- Discussion of the PhD in Statistics with relevant committee;
- Meeting with teaching staff;
- Meeting with students and graduates;
- Meeting with the Head of the department and programme's coordinators.

3. After the virtual site visit, the EEC had a final remote meeting on March 4 to do a point-by-point discussion and to finalize the writing of the report. We used the information from the applications and the visit for this external evaluation report. The information provided by the department was clear and sufficient.

This report will confirm that all three programmes are in line with expected quality standards. We hope that the report and the accreditation process are useful for the department to further improve certain aspects of the high-quality education they offer in mathematics and statistics. Several points in the following findings, strengths and recommendations address all three programmes and not all of them are repeated each time.



B. External Evaluation Committee (EEC)

<i>Name</i>	<i>Position</i>	<i>University</i>
Tuomas Hytönen (Chair)	Professor	University of Helsinki
Efstathia Bura	Professor	TU Wien (Vienna University of Technology)
Markus Bibinger	Professor	University of Würzburg
Charalambos Christoforou	Student	Cyprus University of Technology

C. Guidelines on content and structure of the report

- *The external evaluation report follows the structure of assessment areas.*
- *At the beginning of each assessment area there is a box presenting:*
 - sub-areas*
 - standards which are relevant to the European Standards and Guidelines (ESG)*
 - some questions that EEC may find useful.*
- *The questions aim at facilitating the understanding of each assessment area and at illustrating the range of topics covered by the standards.*
- *Under each assessment area it is important to provide information regarding the compliance with the requirements of each sub-area. In particular, the following must be included:*

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.

Strengths

A list of strengths, e.g. examples of good practices, achievements, innovative solutions etc.

Areas of improvement and recommendations

A list of problem areas to be dealt with, followed by or linked to the recommendations of how to improve the situation.

- *The EEC should state the compliance for each sub-area (Non-compliant, Partially compliant, Compliant), which must be in agreement with everything stated in the report. It is pointed out that, in the case of standards that cannot be applied due to the status of the HEI and/or of the programme of study, N/A (= Not Applicable) should be noted.*
- *The EEC should state the conclusions and final remarks regarding each programme of study as a whole.*
- **The report may also address other issues which the EEC finds relevant.**

1. Study programme and study programme's design and development (ESG 1.1, 1.2, 1.7, 1.8, 1.9)

Sub-areas

- 1.1. Policy for quality assurance
- 1.2. Design, approval, on-going monitoring and review
- 1.3. Public information
- 1.4. Information management

1.1 Policy for quality assurance

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*

1.2 Design, approval, on-going monitoring and review

Standards

- *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*
 - *is designed so that the exams' and assignments' content corresponds to the level of the programme and the number of ECTS*
 - *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*

1.3 Public information

Standards

- *Regarding the programme of study, clear, accurate, up-to date and readily accessible information is published about:*
 - *selection criteria*
 - *intended learning outcomes*
 - *qualification awarded*
 - *teaching, learning and assessment procedures*
 - *pass rates*
 - *learning opportunities available to the students*
 - *graduate employment information*

1.4 Information management

Standards

- *Information for the effective management of the programme of study is collected, monitored and analysed:*
 - *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*
- *Students and staff are involved in providing and analysing information and planning follow-up activities.*

You may also consider the following questions:

- *What is the procedure for quality assurance of the programme and who is involved?*
- *Who is involved in the study programme's design and development (launching, changing, internal evaluation) and what is taken into account (strategies, the needs of society, etc.)?*
- *How/to what extent are students themselves involved in the development of the content of their studies?*
- *Please evaluate a) whether the study programme remains current and consistent with developments in society (labour market, digital technologies, etc.), and b) whether the content and objectives of the study programme are in accordance with each other?*
- *Do the content and the delivery of the programme correspond to the European Qualifications Framework (EQF)?*
- *How is coherence of the study programme ensured, i.e., logical sequence and coherence of courses? How are substantial overlaps between courses avoided? How is it ensured that the teaching staff is aware of the content and outputs of their colleagues' work within the same study programme?*
- *How does the study programme support development of the learners' general competencies (including digital literacy, foreign language skills, entrepreneurship, communication and teamwork skills)?*
- *What are the scope and objectives of the foundation courses in the study programme (where appropriate)? What are the pass rates?*
- *How long does it take a student on average to graduate? Is the graduation rate for the study programme analogous to other European programmes with similar content? What is the pass rate per course/semester?*
- **How is it ensured that the actual student workload is in accordance with the workload expressed by ECTS?**
- *What are the opportunities for international students to participate in the study programme (courses/modules taught in a foreign language)?*
- *Is information related to the programme of study publicly available?*
- *How is the HEI evaluating the success of its graduates in the labor market? What is the feedback from graduates of the study programme on their employment and/or continuation of studies?*
- *Have the results of student feedback been analysed and taken into account, and how (e.g., when planning in-service training for the teaching staff)?*
- *What are the reasons for dropping out (voluntary withdrawal)? What has been done to reduce the number of such students?*

Findings

Findings for PhD Stat.

A standard PhD programme in statistics. High caliber faculty with continuous research activity as evidenced by their publication record, editorial activities and funding support. PhD students appeared to be very satisfied with their studies and research experience.

The programme of study is designed in line with the strategy of the department, intended learning outcomes and corresponds to the European Qualifications Framework. One main focus is to prepare students for cutting-edge research in statistics and recent research contributions demonstrate the success of doing so.

Opportunities for international students to participate in the study programme are limited due to the Greek instruction language and since possibilities to apply for funding from the beginning of their studies are not available (or feasible).

The ECTS assigned to several writing and research stages provide a reasonable formal framework for the programme. This in fact seems to be applied in a rather flexible, non-strict manner by individual supervisors.

The findings on quality assurance and drop-out rates are similar as for the MMS and given in the next paragraph.

Public information about the programme and contact possibilities are available and clear. The department's webpage provides detailed descriptions of the programme, coursework, admission and graduation requirements.

Findings for MMS

The MS in Mathematical Sciences is a broad programme aiming to offer more advanced training in areas of interest to potential students. It appears that the main reasons for its existence are (1) more expert training for high school teachers of mathematics and (2) as a path to the PhD programme in mathematics.

The design of the programme enables a smooth student progression. The programme is mainly research-oriented. The expected workload reflected in ECTS appears to be appropriate.

UCY has implemented a comprehensive system of quality assurance. The department is committed to quality assurance processes, provides a clear analysis of internal quality assurance and strives to benefit from the outcomes for future developments. UCY has set up a Centre for Teaching and Learning to take a crucial role in the quality assurance. Up to now, the centre does not seem to be important to the students at the department, however. The public information on quality assurance is sufficient and the processes are in line with the expected standards. The analysis of student feedback, mainly based on questionnaires filled in by students, seems to be an ad-hoc method but is taken into account by lecturers to improve their courses.

Drop-out rates are rather low in the three programmes. The close supervision of participants and a good pre-selection of students seem to be reasons for this.

Findings for PhD Math.

A standard PhD programme in pure and applied mathematics. High caliber faculty with continuous research activity as evidenced by their publication record, editorial activities and funding. PhD students appeared to be very satisfied with their studies and research experience.

The programme of study is designed in line with the strategy of the department, intended learning outcomes and corresponds to the European Qualifications Framework. One main focus is to prepare students for cutting-edge research in mathematics and recent research contributions demonstrate the success of doing so.

Public information about the programme and contact possibilities are available and clear. The department's webpage provides detailed descriptions of the programme, coursework, admission and graduation requirements.

The findings on quality assurance and drop-out rates are similar as for the MMS and given in the above paragraph. Findings on the structure and ECTS are the same as for the PhD Stat. and mentioned in the first paragraph above.

Strengths

Strengths for PhD Stat.

- Study programme is well designed. Several areas of statistics are represented and reflect research interests of the faculty. There are 7 faculty members in statistics (6 active as the 7th is currently the university rector) with 2 at the rank of lecturer/assistant professor, 1 associate and 4 full professors. A new lecturer/assistant professor slot has been allocated to statistics.
- A broad modern programme on statistics. A potential competitive advantage compared to many Statistics programs in Europe.
- High engagement of the teaching staff. Teaching staff is very active in research.
- Low drop-out rate.

Strengths for MMS

- Students are under close supervision by their academic advisors and appreciate it.
- High engagement of the teaching staff. Teaching staff is very active in research.
- Low drop-out rate.

Strengths for PhD Math.

- Specialization is possible in various directions. Students are successfully trained for high-level research. There are 11 full professors in pure and applied mathematics, 5 associate and 1 at the rank of lecturer/assistant professor.
- High engagement of the teaching staff. Teaching staff is very active in research.
- Low drop-out rate.

Areas of improvement and recommendations

Areas of improvement and recommendations for PhD Stat.

- The current limit of at least 5 students for a graduate course to count for the teaching load of the staff should be lowered to 3, which is not uncommon even in much larger graduate programmes.
- The average duration of study is 12 semesters, which is much longer than the regular duration of the programme which is set to be 8 semesters.
- The recently established interdisciplinary master in data science has the potential to attract students to do research in data science and statistics. Extending the research profile of the Statistics faculty in the direction of interdisciplinary cooperations, machine learning and mathematics for intelligent infrastructure could help to exploit this potential.
- Responsible handling of data and working out reproducible data studies in line with good scientific practice is an important qualification for statisticians. The EEC has no doubt that

participants of the programme learn how to do this. This point should be emphasized also in the intended learning outcomes.

Areas of improvement and recommendations for MMS

- Changing the instruction language to English has the potential to attract international students and increase the appeal of the programme.
- The frequency of elective course offerings varies widely among different courses. Some areas of specialization appear not be available to students at all times. This is not clear from the public information. The EEC recommends sharing information on course offerings which are guaranteed to take place at least once in two years and other courses that are mainly offered as reading courses upon request. Decisions which courses are offered are usually made for the next two-year period but the information is not public.
- More systematically collected data, including student feedback on programmes, gathered in a central database would allow for an improved analysis and conclusions.

Areas of improvement and recommendations for PhD Math.

- The average duration of study is 12 semesters, which is much longer than the regular duration of the programme which is 8 semesters.
- Instruction language is Greek which limits broader appeal of the programme.

Please select what is appropriate for each of the following sub-areas:

Sub-area		<i>Non-compliant/ Partially Compliant/Compliant</i>		
		<i>PhD Stat.</i>	<i>MMS</i>	<i>PhD Math.</i>
1.1	Policy for quality assurance	Compliant	Compliant	Compliant
1.2	Design, approval, on-going monitoring and review	Compliant	Compliant	Compliant
1.3	Public information	Compliant	Compliant	Compliant
1.4	Information management	Partially compliant	Partially compliant	Partially compliant

2. Student – centred learning, teaching and assessment (ESG 1.3)

Sub-areas

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

2.1 Process of teaching and learning and student-centred teaching methodology

Standards

- *The process of teaching and learning supports students' individual and social development.*
- *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.*
- *Mutual respect within the learner-teacher relationship is promoted.*
- *The implementation of student-centred learning and teaching respects and attends to the diversity of students and their needs, enabling flexible learning paths.*
- *Appropriate procedures for dealing with students' complaints regarding the process of teaching and learning are set.*

2.2 Practical training

Standards

- *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.*

2.3 Student assessment

Standards

- *Assessment is consistent, fairly applied to all students and carried out in accordance with the stated procedures.*
- *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.*
- *A formal procedure for student appeals is in place.*
- *Assessors are familiar with existing testing and examination methods and receive support in developing their own skills in this field.*
- *The regulations for assessment take into account mitigating circumstances.*

You may also consider the following questions:

- *How is it monitored that the teaching staff base their teaching and assessment methods on objectives and intended learning outcomes? Provide samples of examination papers (if available).*
- *How are students' different abilities, learning needs and learning opportunities taken into consideration when conducting educational activities?*
- *How is the development of students' general competencies (including digital skills) supported in educational activities?*
- *How is it ensured that innovative teaching methods, learning environments and learning aids that support learning are diverse and used in educational activities?*
- *Is the teaching staff using new technology in order to make the teaching process more effective?*
- *How is it ensured that theory and practice are interconnected in teaching and learning?*
- *How is practical training organised (finding practical training positions, guidelines for practical training, supervision, reporting, feedback, etc.)? What role does practical training have in achieving the objectives of the study programme? What is student feedback on the content and arrangement of practical training?*
- ***Are students actively involved in research? How is student involvement in research set up?***
- *How is supervision of student research papers (seminar papers, projects, theses, etc.) organised?*
- ***Do students' assessments correspond to the European Qualifications Framework (EQF)?***
- *How are the assessment methods chosen and to what extent do students get supportive feedback on their academic progress during their studies?*
- *How is the objectivity and relevance of student assessment ensured (assessment of the degree of achievement of the intended learning outcomes)?*

Findings

Findings for PhD Stat.

Solid PhD programme that provides training to its students at high international level. Despite the low number of students, the faculty offer many reading courses. This gives the opportunity to the students to establish a more personal relationship with the professor.

Different learning instruments including projects with data studies and simulations, traditional lectures and presentations by students prepare for future employment in the academic or the industrial sector. The assessment of dissertations meets high international standards. The programme is flexible and adjusts to individual students' needs and interests. While the development of participants in research is fostered by a close supervision, their autonomy is encouraged by the research proposal, projects that complement course work and opportunities to attend and present at international conferences.

Findings for MMS

Assessment methods are clearly communicated. Different modes of assessment are used which reflect the intended learning outcomes. Students benefit from the close personal academic advice and a high student-to-teacher ratio. The teaching staff offers reading courses for individual students on top of their teaching obligations. Due to the limited resources and number of participants, some MS courses are offered as joint undergraduate/graduate courses. This has a positive effect on the range of courses to be offered but creates also some difficulties to teach graduate students effectively in a targeted way.

Findings for PhD Math.

Solid PhD programme that provides training to its students at high international level. Despite the low number of students, the faculty offer many reading courses. This gives the opportunity to the students to establish a more personal relationship with the professor.

The programme is flexible and adjusts to individual students' needs and interests. While the development of participants in research is fostered by a close supervision, their autonomy is encouraged by the research proposal, projects that complement course work and opportunities to attend and present at international conferences.

Strengths

Strengths for PhD Stat.

- The faculty members have a solid research track record with many publications in first tier statistics journals.
- Close and personal supervision.

Strengths for MMS

- Different modes of assessment including midterms, a final exam and additional projects with presentations.
- Small classes and close supervision beneficial for students.
- Reading courses strengthen the relationship between student and professor. Students who participated in the discussion with the EEC appreciate this form of teaching.

- Students interviewed by the EEC found the master thesis a good experience, especially those who did not have a bachelor thesis. Some Master theses led to publications in international journals.

Strengths for PhD Math.

- Strong research profiles of teachers and supervisors.
- Close and personal supervision.

Areas of improvement and recommendations

Areas of improvement and recommendations for PhD Stat.

- More areas of statistics can be represented via new hires, especially in the area of high dimensional statistics and statistical learning.
- The requirement of at least 5 students for a graduate course to be offered is unrealistic for a department with this student body size. The EEC recommendation is the limit be reduced to 3.
- Lack of funding opportunities for the doctoral students for travel costs at international conferences.

Areas of improvement and recommendations for MMS

- Most lectures are classical white-board lectures before the pandemic. Students appreciate new methods of hybrid learning. It is worth considering using more teaching methods of inverted classroom type.

Areas of improvement and recommendations for PhD Math.

- The requirement of at least 5 students for a graduate course to be offered is unrealistic for a department with this student body size. The EEC recommendation is the limit be reduced to 3.
- Lack of funding opportunities for the doctoral students for travel costs at international conferences.

Please select what is appropriate for each of the following sub-areas:

Sub-area		<i>Non-compliant/ Partially Compliant/Compliant</i>		
		<i>PhD Stat.</i>	<i>MMS</i>	<i>PhD Math.</i>
2.1	Process of teaching and learning and student-centred teaching methodology	Compliant	Compliant	Compliant
2.2	Practical training	Not applicable	Not applicable	Not applicable
2.3	Student assessment	Compliant	Compliant	Compliant

3. Teaching staff (ESG 1.5)

Sub-areas

- 3.1. Teaching staff recruitment and development**
- 3.2. Teaching staff number and status**
- 3.3. Synergies of teaching and research**

3.1. Teaching staff recruitment and development

Standards

- *Institutions ensure the competence of their teaching staff.*
- *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 is regularly engaged in professional and teaching-skills training and development.*
- *Promotion of the teaching staff takes into account the quality of their teaching, their research activity, the development of their teaching skills and their mobility.*
- *Innovation in teaching methods and the use of new technologies is encouraged.*
- *Conditions of employment that recognise the importance of teaching are followed.*
- *Recognised visiting teaching staff participates in teaching the study programme.*

3.2. Teaching staff number and status

Standards

- *The number of the teaching staff is adequate to support the programme of study.*
- *The teaching staff status (rank, full/part time) is appropriate to offer a quality programme of study.*
- *Visiting staff number does not exceed the number of the permanent staff.*

3.3. Synergies of teaching and research

Standards

- *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).*
- *Scholarly activity to strengthen the link between education and research is encouraged.*
- *The teaching staff publications are within the discipline.*
- *Teaching staff studies and publications are closely related to the programme's courses.*

- *The allocation of teaching hours compared to the time for research activity is appropriate.*

You may also consider the following questions:

- *How are the members of the teaching staff supported with regard to the development of their teaching skills? How is feedback given to members of the teaching staff regarding their teaching results and teaching skills?*
- *How is the teaching performance assessed? How does their teaching performance affect their remuneration, evaluation and/or selection?*
- *Is teaching connected with research?*
- *Does the HEI involve visiting teaching staff from other HEIs in Cyprus and abroad?*
- *What is the number, workload, qualifications and status of the teaching staff (rank, full/part timers)?*
- *Is student evaluation conducted on the teaching staff? If yes, have the results of student feedback been analysed and taken into account, and how (e.g., when planning in-service training for the teaching staff)?*

Findings

Findings for PhD Stat.

The faculty are high caliber researchers, publishing in top international journals. Recent hires are in agreement with current trends in statistics. The size of the tenure track faculty in statistics is 6, which is challenging for offering and maintaining a broad and high-quality PhD programme. The areas of expertise of the teaching staff are closely related to the contents of the programme. Their qualifications are commensurate with the objectives and planned learning outcomes.

Findings for MMS

Teaching staff members are very active in research. Their areas of expertise are closely related to the contents of the programme. Additionally to the senior staff with high-level research records, the department successfully hired and integrated young promising assistant professors. Synergies of teaching and research are limited in classes when graduates are jointly taught with undergraduates.

Findings for PhD Math.

Teaching staff members are very active in research and publish in top international journals. Their areas of expertise are closely related to the contents of the programme. The size of the tenure track faculty is sufficient to guarantee a wide spectrum of courses in pure and applied mathematics.

Strengths

Strengths for PhD Stat.

- Strong research profiles of current teaching staff.
- UCY and the department attract top researchers, in particular Cypriots or Greeks, on a competitive international job market.

Strengths for MMS

- Strong research profiles of current teaching staff.

Strengths for PhD Math.

- Strong research profiles of current teaching staff.
- Research areas cover a broad range of topics.
- UCY and the department attract top researchers, in particular Cypriots or Greeks, on a competitive international job market.

Areas of improvement and recommendations

Areas of improvement and recommendations for PhD Stat.

- Develop synergies and collaborations with other departments and researchers within the university and abroad. Interdisciplinary profiles of instructors would enrich the research environment at UCY and foster high-level research with a fruitful and active exchange between theory and practice.
- Increase the number of tenure track faculty.
- English programmes might attract more international top researchers.
- Specialized courses in statistics often have less than 5 participants. Such courses do not contribute to the teaching load of the teaching staff. This leads either to less courses or to a higher allocation of teaching hours compared to the time for research. A smaller required number of participants of 3 appears more appropriate to the EEC.
- Start-up funds and reduced teaching load should be regularly offered to new faculty members.
- Lack of a strategy for advancement of women to address the gender imbalance of the teaching staff.

Areas of improvement and recommendations for MMS

- It is essential to react adequately to upcoming retirements over the next decade to maintain the high standards of research and education. A long-term strategy should be found how to fill and co-ordinate the positions and this strategy should be combined with the future development of the programmes.
- English programmes might attract more international top researchers.
- Lack of a strategy for advancement of women to address the gender imbalance of the teaching staff.

Areas of improvement and recommendations for PhD Math.

- Specialized courses in mathematics often have less than 5 participants. Such courses do not contribute to the teaching load of the teaching staff. This leads either to less courses or to a higher allocation of teaching hours compared to the time for research. A smaller required number of participants of 3 appears more appropriate to the EEC.
- English programmes might attract more international top researchers.
- Start-up funds and reduced teaching load should be regularly offered to new faculty members.
- A hire of a researcher working on optimization could strengthen the profile in applied mathematics, collaboration opportunities in interdisciplinary projects and mathematics for intelligent infrastructure, AI, etc.
- Lack of a strategy for advancement of women to address the gender imbalance of the teaching staff.

Please select what is appropriate for each of the following sub-areas:

Sub-area		<i>Non-compliant/ Partially Compliant/Compliant</i>		
		<i>PhD Stat.</i>	<i>MMS</i>	<i>PhD Math.</i>
3.1	Teaching staff recruitment and development	Compliant	Compliant	Compliant
3.2	Teaching staff number and status	Compliant	Compliant	Compliant
3.3	Synergies of teaching and research	Compliant	Compliant	Compliant

4. Student admission, progression, recognition and certification (ESG 1.4)

Sub-areas

4.1. Student admission, processes and criteria

4.2. Student progression

4.3. Student recognition

4.4. Student certification

4.1 Student admission, processes and criteria

Standards

- *Pre-defined and published regulations regarding student admission are in place.*
- *Access policies, admission processes and criteria are implemented consistently and in a transparent manner.*

4.2 Student progression

Standards

- *Pre-defined and published regulations regarding student progression are in place.*
- *Processes and tools to collect, monitor and act on information on student progression, are in place.*

4.3 Student recognition

Standards

- *Pre-defined and published regulations regarding student recognition are in place.*
- *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.*
- *Appropriate recognition procedures are in place that rely on:*
 - *institutional practice for recognition being in line with the principles of the Lisbon Recognition Convention*
 - *cooperation with other institutions, quality assurance agencies and the national ENIC/NARIC centre with a view to ensuring coherent recognition across the country*

4.4 Student certification

Standards

- *Pre-defined and published regulations regarding student certification are in place.*
- *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.*

You may also consider the following questions:

- *Are the admission requirements for the study programme appropriate? How is the students' prior preparation/education assessed (including the level of international students, for example)?*
- *How is the procedure of recognition for prior learning and work experience ensured, including recognition of study results acquired at foreign higher education institutions?*
- *Is the certification of the HEI accompanied by a diploma supplement, which is in line with European and international standards?*

Findings

Findings for PhD Stat.

The description of student admission, progress and certification steps and criteria is clear and detailed. The admission committee consists of faculty members with expertise in statistics. There are four (4) PhD students in the programme. Most of the students are supported with scholarship (tuition/fees + stipend) and work as teaching assistants, which prepares them for teaching should they opt for an academic position.

Findings for MMS

The description of student admission, progress and certification steps and criteria is clear and detailed. The admission committee consists of faculty members with expertise in mathematics. There are currently six (6) students in the programme.

Findings for PhD Math.

The description of student admission, progress and certification steps and criteria is clear and detailed. The admission committee consists of faculty members with expertise in pure and applied mathematics. There are seven (7) PhD students in the programme, 5 in applied and 2 in pure mathematics. Most of the students are supported with scholarship (tuition/fees + stipend) and work as teaching assistants, which prepares them for teaching should they opt for an academic position.

Strengths

Strengths for PhD Stat.

- The faculty caliber and breadth of expertise. Well-structured programme encompassing mastering of core statistical theory and methodology as well as exposure to a wide spectrum of areas in statistics. Several of the graduates have pursued academic careers in Europe, US and the Middle East.
- A strength of the admission process is that even though the programme is oriented towards graduates in mathematics or statistics, it allows students to make up for training deficiencies by providing them with the opportunity to take undergraduate courses at the beginning of their studies.

Strengths for MMS

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Strengths for PhD Math.

- The faculty caliber and breadth of expertise. High-level research in a wide spectrum of areas in pure and applied mathematics. Several graduates achieved significant research contributions and pursued academic careers.
- A strength of the admission process is that even though the programme is oriented towards graduates in mathematics, it allows students to make up for training deficiencies by providing them with the opportunity to take undergraduate courses at the beginning of their studies.

Areas of improvement and recommendations

Areas of improvement and recommendations for PhD Stat.

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Areas of improvement and recommendations for MMS

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Areas of improvement and recommendations for PhD Math.

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Please select what is appropriate for each of the following sub-areas:

Sub-area		Non-compliant/ Partially Compliant/Compliant		
		<i>PhD Stat.</i>	<i>MMS</i>	<i>PhD Math.</i>
4.1	Student admission, processes and criteria	Compliant	Compliant	Compliant
4.2	Student progression	Compliant	Compliant	Compliant
4.3	Student recognition	Compliant	Compliant	Compliant
4.4	Student certification	Compliant	Compliant	Compliant

5. Learning resources and student support (ESG 1.6)

Sub-areas

- 5.1. Teaching and Learning resources
- 5.2. Physical resources
- 5.3. Human support resources
- 5.4. Student support

5.1 Teaching and Learning resources

Standards

- *Adequate and readily accessible teaching and learning resources (teaching and learning environments, materials, aids and equipment) are provided to students and support the achievement of objectives in the study programme.*
- *Adequacy of resources is ensured for changing circumstances (change in student numbers, etc.).*
- *All resources are fit for purpose.*
- *Student-centred learning and flexible modes of learning and teaching, are taken into account when allocating, planning and providing the learning resources.*

5.2 Physical resources

Standards

- *Physical resources, i.e. premises, libraries, study facilities, IT infrastructure, are adequate to support the study programme.*
- *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.*

5.3 Human support resources

Standards

- *Human support resources, i.e. tutors/mentors, counsellors, other advisers, qualified administrative staff, are adequate to support the study programme.*

- *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.*

5.4 Student support

Standards

- *Student support is provided covering the needs of a diverse student population, such as mature, part-time, employed and international students and students with special needs.*
- *Students are informed about the services available to them.*
- *Student-centred learning and flexible modes of learning and teaching, are taken into account when allocating, planning and providing student support.*
- *Students' mobility within and across higher education systems is encouraged and supported.*

You may also consider the following questions:

- *Evaluate the supply of teaching materials and equipment (including teaching labs, expendable materials, etc.), the condition of classrooms, adequacy of financial resources to conduct the study programme and achieve its objectives. What needs to be supplemented/ improved?*
- *What is the feedback from the teaching staff on the availability of teaching materials, classrooms, etc.?*
- *Are the resources in accordance with actual (changing) needs and contemporary requirements? How is the effectiveness of using resources ensured?*
- *What are the resource-related trends and future risks (risks arising from changing numbers of students, obsolescence of teaching equipment, etc.)? How are these trends taken into account and how are the risks mitigated?*
- *Evaluate student feedback on support services. Based on student feedback, which support services (including information flow, counselling) need further development?*
- *How is student learning within the standard period of study supported (student counselling, flexibility of the study programme, etc.)?*
- *How students' special needs are considered (different capabilities, different levels of academic preparation, special needs due to physical disabilities, etc.)?*
- *How is student mobility being supported?*

Findings

Findings for PhD Stat.

Physical resources (libraries, classrooms, computer labs, equipment), teaching material and equipment are well designed, modern and of high quality. PhD programmes are designed as full-time programmes. Nevertheless, funding opportunities for PhD students are limited and not sufficient to cover living costs. Some students have part-time jobs on the side to cover their expenses. Teaching assistantships are appreciated by students as a funding opportunity. Scholarships are not granted before the second semester.

Findings for MMS

The live streaming of a course during the virtual site visit ran smoothly and the professor used contemporary tools for online learning. In conclusion, these tools are available. Student mobility is encouraged.

Findings for PhD Math.

PhD programmes are designed as full-time programmes. Nevertheless, funding opportunities for PhD students are limited and not sufficient to cover living costs. Some students have part-time jobs on the side to cover their expenses. Teaching assistantships are appreciated by students as a funding opportunity. Scholarships are not granted before the second semester.

Strengths

Strengths for PhD Stat.

- Facilities including computer labs are well designed, modern and of high quality.
- Well-resourced library on the campus.
- PhD students have offices.

Strengths for MMS

- Facilities including computer labs are well designed, modern and of high quality.
- Well-resourced library on the campus.

Strengths for PhD Math.

- Facilities including computer labs are well designed, modern and of high quality.
- Well-resourced library on the campus.
- PhD students have offices.

Areas of improvement and recommendations

Areas of improvement and recommendations for PhD Stat.

- The administrative staff of the department is overloaded. The number of secretaries is not sufficient. The IT support assistant will retire soon and the future of IT support within the department seems to be unclear. More administrative positions in the department are required.

- Especially for prospective students coming from abroad, lack of funding opportunities constitute a major disincentive. Students take longer than the usual graduation time in statistics PhD programmes (most students graduate in 6 years as opposed to 4). Our recommendation is that scholarships be made available upon admission and the amount be commensurate with basic living cost.

Areas of improvement and recommendations for MMS

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Areas of improvement and recommendations for PhD Math.

- The administrative staff of the department is overloaded. The number of secretaries is not sufficient. The person for IT support will retire soon and the future of IT support within the department seems to be unclear. More administrative positions in the department are required.
- Especially for prospective students coming from abroad lack of funding opportunities constitute a major disincentive. Students take longer than the usual graduation time in mathematics PhD programmes (most students graduate in 6 years as opposed to 4). Our recommendation is that scholarships be made available upon admission and the amount be commensurate with basic living cost.

Please select what is appropriate for each of the following sub-areas:

Sub-area		<i>Non-compliant/ Partially Compliant/Compliant</i>		
		<i>PhD Stat.</i>	<i>MMS</i>	<i>PhD Math.</i>
5.1	Teaching and Learning resources	Compliant	Compliant	Compliant
5.2	Physical resources	Compliant	Compliant	Compliant
5.3	Human support resources	Partially compliant	Partially compliant	Partially compliant
5.4	Student support	Partially compliant	Compliant	Partially compliant

6. Additional for doctoral programmes (ALL ESG)

Sub-areas

6.1. Selection criteria and requirements

6.2. Proposal and dissertation

6.3. Supervision and committees

6.1 Selection criteria and requirements

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*

6.2 Proposal and dissertation

Standards

- *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 process of submitting the dissertation to the university library is set.*

6.3 Supervision and committees

Standards

- *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.*

You may also consider the following questions:

- *How is the scientific quality of the PhD thesis ensured?*
- *Is there a link between the doctoral programmes of study and the society? What is the value of the obtained degree outside academia and in the labour market?*
- *Can you please provide us with some dissertation samples?*

Findings

Most PhD students have an undergraduate or graduate degree from UCY. The pre-selection and supervision of students works well as reflected by the low drop-out rate. Clear criteria future students need to meet and the selection procedure are well established and communicated. The process for completion and defence of the dissertation is clear and transparent. The assessment of dissertations meets high international standards.

Most students require significantly more time than 8 semesters to complete their degree.

Strengths

- Students admitted to the two PhD programmes show high interest in research. The programmes led to relevant research contributions and publications in high-level international journals.
- Students are satisfied with the standards.

Areas of improvement and recommendations

- The EEC suggests to add a roadmap with milestones to the research proposal towards the completion of the research project.
- The review time for the thesis readers should be specified.



Please select what is appropriate for each of the following sub-areas:

Sub-areas		<i>Non-compliant/ Partially Compliant/Compliant</i>
6.1	Selection criteria and requirements	Compliant
6.2	Proposal and dissertation	Compliant
6.3	Supervision and committees	Compliant

D. Conclusions and final remarks

The department offers strong research-oriented graduate programmes in pure mathematics, applied mathematics and statistics. The EEC acknowledges the key role of the department in establishing higher education standards in Cyprus. It is the only department with PhD programmes and faculty graduates of high caliber in mathematics and statistics in Cyprus. The PhD programmes are well designed along the lines of highly respectable international PhD programmes, such as, for example, in US universities. Graduates of the programmes are highly sought after. Students have close access to personal academic advice and courses with high student-to-teacher ratio. High priority should be given to faculty replacement plan in view of the upcoming retirements.

We point at important issues that came up during the discussion with faculty and students

- that address all three evaluated graduate programmes.
 1. Increasing the international visibility of the programmes.
 - (a) A potential remedy is changing the language of instruction to English.
 - (b) Operate a visitor programme. Visitors offer short topics courses in their area of expertise. The courses will count toward graduate credit and be open to in-house and international students.
 2. Provide more administrative support for the teaching staff. This results in less administrative work for the teaching staff and allows them to invest their time in research and teaching.
 3. Start-up funds and reduced teaching load should be regularly offered to new faculty members. Foster incentives to apply for external research grants.
 4. The requirement of at least 5 students for a graduate course to be offered is unjustifiably high for the size of the graduate student body of the department. EEC's recommendation is to be decreased to 3.
- that address both PhD programmes.
 5. The amount of the financial assistance was deemed inadequate for a participant to cover the cost of living independently. Teaching assistantships and scholarships are not feasible for students entering the programme from abroad.
 - (a) EEC recommends substantial increase to meet basic living costs.
 - (b) Changing the language of instruction to English allows students entering the programme from abroad to acquire teaching assistantships.
- that address the PhD Statistics programme.
 6. The area of research for new hires in statistics. This is an important part of strategic planning and vision for the department and in particular for the statistics group.
 - (a) EEC suggestions: high-dimensional statistics, statistical learning, data science.



- (b) Take into account potential for interdisciplinary collaborations.
- (c) Leverage the rather unique feature of the UCY Statistics program in Europe in its comparability to programs offered by Statistics departments in US universities, in particular as to wide spectrum of training covering multiple areas of Statistics.
- that address the PhD Mathematics programme.
 - 7. The area of research for new hires in mathematics.
 - (a) EEC suggestions: mathematical machine learning, optimization, or interface of optimization/learning.



E. Signatures of the EEC

<i>Name</i>	<i>Signature</i>
Tuomas Hytönen (Chair)	
Efstathia Bura	
Markus Bibinger	
Charalambos Christoforou	

Date: March 9, 2022

