Doc. 300.1.2

Higher Education Institution's Response

Date: 13/04/2021

- **Higher Education Institution:**
  University of Central Lancashire, Cyprus (UCLan Cyprus)

- **Town: Larnaca**

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

  In Greek:

  Πτυχίο Πληροφορικής, 4 years/240 ECTS

  In English:

  Computing (BSc Hons), 4 years/240 ECTS

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

- **Programme's status:** Currently Operating

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 are grateful to the members of the External Evaluation Committee (EEC) for their time and constructive feedback with regards to the evaluation of the BSc (Hons) Computing programme at the School of Sciences at UCLan Cyprus. We genuinely appreciate their input and believe it will have a positive impact for the further development of our programme.

We also appreciate the EEC's positive words acknowledging the efforts and achievements of the academic team. The feedback encourages us to carry on with and intensify our efforts. At the same time, we strive for excellence at teaching and learning as well as research, so we welcome the recommendations for further improvement.

In this report, we provide our answers on how we will improve our programme based on the EEC's suggestions in the identified areas.

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

EEC REPORT

Findings for Computing (BSc Hons)

Given that the degree programs result in dual degrees given by UCLan Cyprus and UCLan UK, the degree program content and grading follow the standards and expectations of the two organizations and countries. The B.Sc. program is well aligned with professional education and the degree is accredited by the British Computing Society. The program covers a range of topics constrained by the size of the faculty. The program has a small number of students and they are supported by a very good student-teacher ratio. The program advocates student-centered learning. The School aims to have a moderate increase in students in the next few years.

Strengths for Computing (BSc Hons)

Industry relevance is commendable. Given the small student numbers, a closeness of educational experience emerges resulting in excellent student support. Very good student feedback (90% of students have given positive feedback).

Common strengths for the three programs
The rapid response across all programs to the covid situation was noted and applauded.
The facilities represent the state of the art and provide excellent support for both education and research.

Areas of improvement and recommendations for Computing (BSc Hons)

The program covers many topics and many of them relate to professional aspects in computing. The professional relevance is commendable; however, a B.Sc. program in computing is expected to also cover more theoretical aspects of computer science. It would be important to revisit the key core computer science topics and ensure that they are covered sufficiently.

The first-year CS curriculum seems relatively light. The committee note that this is a four-year degree program; however, it is felt that if further CS module could be introduced in the first year. One suggestion offered was the inclusion of a module offering glimpses of modules to be undertaken in subsequent years.

The committee noted a large number of optional modules; however, they recommend consideration of the associated curricula burden for faculty. While this effort is applauded the question remains as to the efficacy of maintaining modules with very low student numbers.

UCLAN CYPRUS RESPONSE

"The program covers many topics and many of them relate to professional aspects in computing. The professional relevance is commendable; however, a B.Sc. program in computing is expected to also cover more theoretical aspects of computer science. It would be important to revisit the key core computer science topics and ensure that they are covered sufficiently."

In response to the EEC's recommendation to revisit key core computer science topics, the BSc (Hons) Computing team undertook an evaluation examining the combination of modules and core computing contents. Our evaluation confirmed coverage and depth of core computer science topics and relevant skills as suggested by the ACM, AIS and IEEE-CS in the latest overview report for Computing Curricula. Moreover, during our evaluation and taking into consideration the EEC's recommendations on the content of the programme, we introduced an additional module in Year 1 (Level 4), titled "Explorations in Computing" (10

ECTS). One of the key objectives of the module is to enthuse students by introducing important topics of computer science, such as computability, intractability, machine learning, etc. Additionally, we introduced a new elective module in Year 4 (Level 6), titled "Artificial Intelligence" (CO3519, 10 ECTS). The module descriptors for the newly designed modules are provided in Appendix 1.

"The first-year CS curriculum seems relatively light. The committee note that this is a four-year degree program; however, it is felt that if further CS module could be introduced in the first year. One suggestion offered was the inclusion of a module offering glimpses of modules to be undertaken in subsequent years."

In response to the EEC's recommendation to introduce an additional CS module in year 1, which "*currently seems relatively light*", as mentioned above, we are adding a new module, "Explorations in Computing" (10 ECTS). Additionally, we are restructuring the delivery of Years 1 and 2 by bringing the "Introduction to Networking" (CO1507) module forward to Year 1 and deferring the "Algorithms and Data Structures" (CO1406) module to Year 2. This change will enable a smoother workload for students, as they will have a balanced load of programming-related and computer science-related modules throughout their first 2 years. At the same time, we removed the two compulsory English modules (10 ECTS each) and introduced the new compulsory module "Explorations in Computing" (10 ECTS) along with an optional University elective module (10 ECTS).

In response to the EEC's recommendation to include a module offering glimpses of modules to be undertaken in subsequent years, we are covering this within the new "Explorations in Computing" module. One of the main objectives of this module is to provide glimpses of important concepts covered in specialisation modules in subsequent years.

"The committee noted a large number of optional modules; however, they recommend consideration of the associated curricula burden for faculty. While this effort is applauded the question remains as to the efficacy of maintaining modules with very low student numbers."

Regarding the EEC's concern of a large number of optional modules and the subsequent burden on the faculty, this is something we agree and confirm. As noted, the two English modules are discontinued in the updated programme structure and students have the choice of a University elective. Additionally, we discontinued the "Object Oriented methods in Computing" (CO3402) optional module of Year 4 and shifted some of its non-overlapping content to other modules (particularly the "Software Development" (CO2401) and the "Agile Professional" (CO2403)). Finally, we discontinued the "Research Methods in Computing" (CO3709) optional module of Year 4, as much of its material is now covered in the "Computing Challenge" (CO1111) and in the "Double Project (Thesis)" (CO3808) modules. At the same time, as we are still offering a good selection of optional modules, we intend to continue our existing practice of asking students to make a selection early on in the previous academic year, so we can inform them when there is inadequate demand for a specific elective. More specifically, students are informed of available optional modules for the next academic year and asked to make their selection around March of the current academic year. This allows the programme team and the School to plan for necessary resources for the next academic year and avoid running optional modules when they are selected by only a small number of students. With the aforementioned changes and processes as well as from our experience so far, we expect that we will be able to run at least one less optional module compared to previous years, while increasing the average number of students per running optional module. As a result, we also anticipate programme savings, in terms of academic resources.

The updated structure of the programme reflecting the above changes is provided in Appendix 2.

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

EEC REPORT

Findings for the three programs

The Department establishes student admission criteria for each programme, which are adhered to. The three programs have excellent industry relevance, and the studies support professional certification. The number of students in the teaching rooms is suitable for theoretical, practical, and laboratory lessons. The teaching materials are up-to-date and of an appropriate standard.

The teaching staff of the Department seems to have regular and effective communication with their students and provide timely and effective feedback to their students. Students were very complimentary of access to staff and appreciate the criteria and the method of assessment as well as the criteria for marking being published in advance. The learning process is properly designed to achieve the expected learning outcomes. The assessment allows students to demonstrate the extent to which the intended learning outcomes have been achieved.

The members of teaching personnel for each course have the relevant formal and fundamental qualifications for teaching the course, as described by the legislation including subject specialisation and publications within their respective disciplines.

Strengths of the three programs

The teaching staff of the Department seems to have regular and effective communication with their students and provide timely and effective feedback to their students.

The ratio of the number of students to the total number of teaching personnel is adequate for the support and safeguarding of the programme's quality.

The great majority of teaching is delivered by resident faculty that are employed on a full-time basis and all full-time staff have Ph.D. qualifications.

Areas of improvement and recommendations for the three programs

The university does not have an instrument for sabbaticals. The EEC recommends developing an instrument for enabling both short-term and longer-term research visits. In addition, inter-sectoral staff mobility with industry would appear to be beneficial in supporting the development and exchange of knowledge and skills building on the synergies between the academic environment and the industry.

The committee would encourage examination of the proportions of full-time faculty and adjunct faculty. The committee would welcome an increase in full-time faculty and their reduction in adjunct faculty, commensurate with the aim of increasing student numbers.

The EEC values the real-life industry relevance of the degree programs; however, recommends strengthening also the research connection of the M.Sc. degree programs.

Faculty research productivity is paramount. In order to facilitate this, faculty-student contact hours should be monitored and perhaps reduced. Research output is a key parameter in global university rankings.

UCLan Cyprus does not have a Ph.D. program at the moment. A number of students have continued their Ph.D. studies at UCLan UK. The EEC recommends exploring the possibilities of a joint Ph.D. program with the UK campus. This could motivate research-oriented students to choose the M.Sc. programs at UCLan

Cyprus. A Ph.D. program is a very necessary instrument for supporting research in general. This would necessitate dedicated research accommodation for the Ph.D. students. A critical mass of Ph.D. students would help the research student experience. Ph.D. students can help in running laboratories and guiding undergraduate/master's theses as part of the research training. The committee would encourage this.

UCLAN CYPRUS RESPONSE

"The university does not have an instrument for sabbaticals. The EEC recommends developing an instrument for enabling both short-term and longer-term research visits. In addition, inter-sectoral staff mobility with industry would appear to be beneficial in supporting the development and exchange of knowledge and skills building on the synergies between the academic environment and the industry."

We agree with the EEC that an instrument for sabbaticals can be beneficial. Due to its young age, the School/University did not have a Sabbatical Scheme. To this date, the academics had opportunities for short-term and longer-term research visits through the many funded projects they are engaged in and which include research visits. Also, the University participates in the Erasmus+ programme, which funds short-term teaching and internship mobilities to other partner institutions. Already, many of the School's –and the programme's—faculty have taken advantage of this and have participated in such mobilities (e.g. at the Univ. of Lille, France, or at the Univ. of Macedonia, Greece) that offer the opportunity to initiate discussions and exchange ideas on further research collaborations. Furthermore, depending on its available funds, the School often sponsors training or research visits for each faculty member. Nevertheless, we acknowledge the importance and benefits of a sabbatical scheme, especially in terms of providing additional opportunities for the academics to engage in short- or long-term research mobilities and activities, and thus, further enhancing our research environment. After the recommendation of the EEC during the evaluation visit, a request had been made at the University level to develop a sabbatical scheme for the University. This has already been drafted by the Senior Academic Management Team and it is currently awaiting approval by the University Senate (the draft is expected to be reviewed/approved during the next Senate meeting, on June 3rd, 2021). It is expected that the approved sabbatical scheme will be in effect by the new academic year.

We also agree with the EEC's recommendation that inter-sectoral staff mobility with industry can be beneficial. The School of Sciences fully supports such mobilities and until now, this was materialised primarily through Erasmus mobilities with industry partners. Following the EEC's recommendation and the implementation of the new University Sabbatical Scheme, we anticipate that academics will have more opportunities to strengthen their engagement with the industry.

"The committee would encourage examination of the proportions of full-time faculty and adjunct faculty. The committee would welcome an increase in full-time faculty and their reduction in adjunct faculty, commensurate with the aim of increasing student numbers."

As per the EEC comments, currently, the below is part of the strengths of the programme:
"*The ratio of the number of students to the total number of teaching personnel is adequate for the support and safeguarding of the programme's quality.*
The great majority of teaching is delivered by resident faculty that are employed on a full-time basis and all full-time staff have Ph.D. qualifications."
The School (and the Programme) is committed to continue this good practice. Academic resources are reviewed at the School and programme level every year and necessary provisions/budgets are requested for the hiring of new academic staff as necessary. As the programme grows in terms of student numbers, we agree with the EEC that the hiring of new full-time faculty will become necessary and relevant actions will be taken.

"The EEC values the real-life industry relevance of the degree programs; however, recommends strengthening also the research connection of the M.Sc. degree programs."

This is not applicable to the BSc (Hons) Computing.

"Faculty research productivity is paramount. In order to facilitate this faculty-student contact hours should be monitored and perhaps reduced. Research output is a key parameter in global university rankings."

We agree with the EEC's comment and we consider it vital for our academics to be productive in research. To ensure and support this, the School (and the University) operates an academic workload model, which as it was observed and noted by the EEC, follows an interactive process of defining the academics' yearly workload and considers each academic's individual plans. As a result, the workload model provides the necessary foundations and processes to be able to adjust the distribution of academics' time between teaching, research and administrative duties. In summary, the workload model is prepared by all academics before the commencement of the academic year, and it is reviewed and discussed with the Head of School. The standard target distribution of the academics' workload hours is 40% teaching, 40% research and 20% administration, but during the annual review, other adjustments can be made according to the academic's research output and engagement. The workload model considers several aspects of the responsibilities of the academics on the aforementioned three areas, along with the time allocated to each. As a result, once the model is prepared, academics who are above the allocated 40% research active, can request a teaching reduction and increase in research allocation hours. It is the responsibility of the academic and the Head of School to ensure during the annual review meeting that academics are allocated the needed time to conduct research and be productive in this area. The workload model has been in operation for the last 6 years and it has proven very effective in assisting the School and the academics to keep a good balance between research, teaching and administrative work. It is a process we consider important for the sustainability and strengthening of our research environment, as well as for ensuring that teaching material is enhanced with the latest research developments, and as such, we are committed in continuing.

Moreover, as it was also observed by the EEC, all full-time academics of the BSc (Hons) Computing programme are research active and many have ongoing high-quality publications in their field of expertise and have successfully received external research funding from international, national and internal funding sources and/or participated in international research projects. A list of publications (including high-impact journal publications, scientific monographs, conference publications including best paper awards, book, etc) as well as a list of externally funded research projects for each academic are available on the university's website (www.uclancyprus.ac.cy).

"UCLan Cyprus does not have a Ph.D. program at the moment. A number of students have continued their Ph.D. studies at UCLan UK. The EEC recommends exploring the possibilities of a joint Ph.D. program with the UK campus. This could motivate research-oriented students to choose the M.Sc. programs at UCLan Cyprus. A Ph.D. program is a very necessary instrument for supporting research in general. This would necessitate dedicated research accommodation for the Ph.D. students. A critical mass of Ph.D. students would help the research student experience. Ph.D. students can help in running laboratories and guiding undergraduate/master's theses as part of the research training. The committee would encourage this."

The School of Sciences, and UCLan Cyprus in general, does not currently offer PhD degrees. Academics of the School act as PhD supervisors for PhD students from other Universities, primarily UCLan UK. The School is positive in offering its own PhD degrees and we believe that this will be an additional benefit to assist the School in further enhancing its research environment. The School will investigate this possibility and take necessary actions (e.g. validate new PhD programmes through UK and Cyprus Quality Assurance Agencies).

3. Teaching Staff

(ESG 1.5)

EEC REPORT

Findings for Computing (BSc Hons)

The number of the teaching staff is adequate to support the programme of study. The teaching staff status is appropriate to offer a quality programme of study. The visiting staff number does not exceed the number of the permanent staff. There is sufficient evidence of staff on this programme linking their research to their teaching. Promotion processes seem transparent and staff engage in professional and teaching skills training.

Strengths for Computing (BSc Hons)

The team has provided a wide range of relevant modules that are core to any computing course.

Area of improvement for the three programs:

The committee applauds the programs for their close engagement with the companies; however, the counsel a judicious balance between training and education. It is noted that adjunct staff present with specialized industrial knowledge and expertise.

There is a wide range of assessment instruments used in delivering the modules.

Areas of improvement and recommendations for Computing (BSc Hons)

The first-year CS curriculum seems relatively light. The committee note that this is a four-year degree program; however, it is felt that if further CS module could be introduced in the first year. One suggestion offered was the inclusion of a module offering glimpses of modules to be undertaken in subsequent years.

The committee recommends monitoring the scheduling and burden of assignments for students in order to avoid clustering and disproportionate burden at given times.

Area of improvement for the three programs:

The committee encourages the staff to continue with the production of high-quality research publications. In some cases, research output seemed to be declining given teaching work.

The committee noted a large number of optional modules, however, they recommend consideration of the associated curricula burden for faculty. While this effort is applauded the question remains as to the efficacy of maintaining modules with very low student numbers.

UCLAN CYPRUS RESPONSE

“The committee applauds the programs for their close engagement with the companies; however, the counsel a judicious balance between training and education. It is noted that adjunct staff present with specialized industrial knowledge and expertise.
There is a wide range of assessment instruments used in delivering the modules.”

We thank the EEC for the positive feedback with regards to the programme’s close engagement with the industry as well as the wide range of assessment instruments utilised within the programme.

"The first-year CS curriculum seems relatively light. The committee note that this is a four-year degree program; however, it is felt that if further CS module could be introduced in the first year. One suggestion offered was the inclusion of a module offering glimpses of modules to be undertaken in subsequent years."

This comment has been addressed in Section 1 and our response can be found in page 5.

"The committee recommends monitoring the scheduling and burden of assignments for students in order to avoid clustering and disproportionate burden at given times."

We agree with the EEC's recommendation. The School (and consequently the programme) already has a process for the monitoring and scheduling of student assessment deadlines to ensure that students' workload is balanced throughout the academic year, and that students are informed early enough of all their deadlines, so as to plan their time allocation accordingly. More specifically, at the start of the academic year, all module leaders have to submit to the School's administration office all their module assessments along with their deadlines. The administration office, with the help of the course leaders, reviews the information and if they identify any time periods with high workload for students, they request from the module leaders to make necessary adjustments. Once this process is complete and the assessment schedule is approved by the course leaders and Head of School, then it is communicated to all module leaders who release the information to the students. In the event of unforeseen circumstances that may require the change of an approved assessment deadline during the academic year, then on the request of the module leader, this is reviewed by the course leader and the Head of School with input from student representatives, and an appropriate new deadline may be provided.

"The committee encourages the staff to continue with the production of high-quality research publications. In some cases, research output seemed to be declining given teaching work."

We would like to assure the committee that high quality research is an essential element of our academic work and as reported in Section 2 (page 8), the School operates an academic workload model which is prepared and reviewed on an annual basis and which aims to safeguard academic's time to conduct research. It is true that research output may vary from year to year, depending on the research work an academic is working on, but it is definitely not overall declining. A list of publications for each academic is available on the university's website (www.uclancyprus.ac.cy). The list includes high-impact journal publications, scientific monographs, conference publications including best paper awards, book, etc.

"The committee noted a large number of optional modules, however, they recommend consideration of the associated curricula burden for faculty. While this effort is applauded the question remains as to the efficacy of maintaining modules with very low student numbers."

This comment has been addressed in Section 1 and our response can be found in page 5.

"The committee recommends exploring the use of blended learning post-covid."

The team is happy to explore the possibility of continuing existing (covid related) and implementing new blended learning approaches for the programme post-covid, always within the guidelines and regulations of the CYQAA and UK QAA.

4. Students

(ESG 1.4, 1.6, 1.7)

EEC REPORT

Findings for the three programmes

In the three degree programs, the students receive dual-degree certificates from UCLan Cyprus and UK, respectively.
Certification includes details on the degree structure, learning goals, and level of achievement. The degree program design has taken the ACM curriculum into account and the programs are aligned with industry certifications such as Cisco CCNA and the Linux professional curriculum. There are excellent synergies in administration functions, planning of teaching, and best practices with the UCLan UK. The students receive help and support from the administration regarding the admission and education-related forms and processes. The Admission Team is responsible for the processes. Approximately 30% of the B.Sc. students continue to the M.Sc. in Computing.

Strengths for the three programs

The student selection process is transparent, and the process is implemented in a consistent manner.
Student study progress is monitored, and feedback is gathered on a systematic basis.

Areas of improvement and recommendations for the three programs

The student selection criteria differ between the Computing and Cybersecurity M.Sc. programs. The committee encourages the internationalization of the M.Sc. programmes.

The first-year CS curriculum seems relatively light. The committee note that this is a four-year degree program; however, it is felt that if further CS module could be introduced in the first year. One suggestion offered was the inclusion of a module offering glimpses of modules to be undertaken in subsequent years.

The programming courses start with imperative Java and object-oriented programming is introduced later. The committee invites the B.Sc. program to consider objects early versus objects late OOP learning strategy. The committee notes the current objects late strategy. Object-oriented concepts are, however, “informally” introduced in the games module in year two. Harmonization of these strategies would strengthen the programming modules.

The committee encourages the introduction of an AI module.

The committee noted a large number of optional modules; however, they recommend consideration of the associated curricula burden for faculty. While this effort is applauded the question remains as to the efficacy of maintaining modules with very low student numbers.

UCLAN CYPRUS RESPONSE

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This is not applicable to BSc (Hons) Computing.

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This recommendation has been addressed in Section 1 and our response can be found in page 5.

"The programming courses start with imperative Java and object-oriented programming is introduced later. The committee invites the B.Sc. program to consider objects early versus objects late OOP learning strategy. The committee notes the current objects late strategy. Object-oriented concepts are, however, "informally" introduced in the games module in year two. Harmonization of these strategies would strengthen the programming modules."

We agree with the EEC that this recommendation can have a positive impact to the development of programming skills of our students. To this end, we introduced OOP concepts already in the newly developed, 1st Year module "Explorations in Computing" (module descriptor is available in Appendix 1). We will also continue to further enhance OOP skills in Year 2 via the "Games Concepts" (CO1301) module as well as the "Algorithms and Data Structures" (CO1406) module.

"The committee encourages the introduction of an AI module."

This recommendation has been addressed in Section 1 and our response can be found in pages 4-5.

"The committee noted a large number of optional modules; however, they recommend consideration of the associated curricula burden for faculty. While this effort is applauded the question remains as to the efficacy of maintaining modules with very low student numbers."

This recommendation has been addressed in Section 1 and our response can be found in page 5.

5. Resources

(ESG 1.6)

EEC REPORT

Findings for all three programs

The degree programs advocate student-centered learning and the programs have a relatively small number of students resulting in a favourable student-teacher ratio. The students appear to enjoy excellent tutoring and mentoring in the programs. Student satisfaction is a key performance indicator and the degree programs have attained top results in this metric. 75-80% of the graduates are being employed within three years. 83% of the students are reported to complete annual studies with very few interruptions or withdrawals.

The degree programs are based on modules. Students have a selection of optional modules depending on the degree program. The students are asked during the enrolment process what modules they plan to take. The B.Sc. and M.Sc. program does not have a significant overlap in the modules. The module offering is based on student participation and a module is not given if the quota is not reached. This results in unpredictability in terms of the modules that are given; however, the uncertainty is mitigated by estimating module popularity and also by the other programs sharing modules.

The staff is well aware of the quality assurance policy and it is an integral part of the everyday operations. The students benefit from a very good student-teacher ratio and student feedback is very positive.

Modules have been aligned with professional certification, such as Cisco CCNA and Linux professional curriculum.

Overall, the programs receive feedback from the industry and the graduating students appear to have excellent career prospects in the industry. The interviewed students emphasized the value of the degrees.

Strengths for Computing (BSc Hons)

UCLan has good international networks and students have possibilities for internships abroad.

During the discussions, the teaching and administration staff had a positive and forward-looking attitude giving the impression that the degree programs have a solid basis. Interviews with the students supported this view.

Student feedback, complaints, and ideas are taken into account. The students reported that improvement ideas have been considered and there was an example of a course improvement initiated by a student.

The building facilities that were assessed based on the provided videos appear to be excellent and remote education is implemented following good practices. The laboratories and IT infrastructure support studies and research activities.

Areas of improvement and recommendations for Computing (BSc Hons)

The program is recommended to examine the balance between core computer science and the applied industry-oriented topics. Industry relevance is an important advantage of the program; however, there is a risk of vendor lock-in and losing relevance when technologies and industry requirements change. The EEC recommends expanding the AI and machine learning related topics.

The School aims to increase the number of female students in the degree programs and the staff is active in related ACM activities. The EEC commends the work and recommends continuing these efforts. The EEC notes the high representation of female faculty members, which is a very good situation at a computer science unit.

UCLAN CYPRUS RESPONSE

"The program is recommended to examine the balance between core computer science and the applied industry-oriented topics. Industry relevance is an important advantage of the program; however, there is a risk of vendor lock-in and losing relevance when technologies and industry requirements change. The EEC recommends expanding the AI and machine learning related topics."

In terms of the recommendation to examine the risk of vendor lock-in, we understand the risk and we agree with the EEC's concern. As it was noted by the EEC, we do have a number of alignments between our modules and industrial certifications, e.g. Cisco and Linux Professional certifications. However, our primary objective is to deliver universally applicable skills to our students. Thus, we are always careful not to allow the specific tools and vendor technologies to take over the content of the corresponding modules. In fact, the specific alignments provide opportunities for students to practice on tools and equipment widely used in industry, in addition to the overall computing content carefully prepared according to specific learning objectives. For example, in "Mobile Computing" (CO2509) the students are introduced to the complexity of the mobile platform ecosystem, and the labs cover a specific platform (i.e. Android development), in order for the students to be able to apply the theory to practice. However, the essence of the module remains in developing core skills related to researching and understanding contemporary topics in mobile computing, including Mobile & Wearable HCI, Ubiquitous Computing, constraints imposed by mobility, etc. Having said this, we should clarify that in most cases, any material related to professional certificates (e.g. the ones by CISCO) is covered in top-up sessions, which are beyond the normal contact hours of the corresponding modules. This ensures that the delivery of the core learning objectives of each module remain the top priority.

Regarding the recommendation to expand the AI and ML related topics, as described in Section 1 (pages 4-5), we introduced a new module on "Artificial Intelligence" (CO3519) in Year 4 of the programme. The module descriptor of the module is provided in the Appendix 1.

"The School aims to increase the number of female students in the degree programs and the staff is active in related ACM activities. The EEC commends the work and recommends continuing these efforts. The EEC notes the high representation of female faculty members, which is a very good situation at a computer science unit."

We appreciate the EEC's comment and the recognition of our efforts towards increasing the number of female students in the BSc (Hons) Computing programme. This remains a priority for us and we will continue and strengthen our efforts towards this goal.

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

EEC REPORT

The EEC evaluated the School of Computing and the B.Sc. program in Computing, M.Sc. in Computing, and M.Sc. in Cybersecurity based on the provided accreditation reports and the remote site visit. The School and the three programs were found to have high standards and meet the quality expectations. Based on the materials and the site visit, the EEC has identified a number of areas in which the School and the three programs can make improvements to strengthening their profile and increasing impact.

UCLan Cyprus and the School of Computing advocate student-centered learning and the three evaluated programs have a relatively small number of students resulting in a favorable student-teacher ratio. The students appear to enjoy excellent tutoring and mentoring in the programs. There would seem to be a significant emphasis upon student learning support and the students themselves seem to both recognize and value such.

As a private university, there is a focus on education with an emphasis on degree programs that are self-sustaining in terms of finances. Thus the workload profile of the staff is teaching-oriented; however, research is an integral part of the strategy and the aspirations of the university, and while this is clearly evident an environment needs to be maintained that fully recognizes, measures and rewards research endeavor.

UCLan Cyprus has excellent synergies with UCLan UK at Preston. Joint planning of education appears to work very well. It is important that UCLan Cyprus continues to leverage resources and skills at UCLan Preston and conversely that UCLan Preston leverages emerging expertise at UCLan Cyprus. This relationship can prove mutually beneficial.

The EEC recommends to further leverage the synergies between UCLan Cyprus and UCLan UK while taking the challenges introduced by Brexit into account, for example differing privacy and other regulations. The joint delivery of education is a significant opportunity that should be explored, and which may yield critical mass in certain programmes and afford better economies of scale.

The School is focused on developing and improving the current programs. The EEC commends this strategy and encourages a strategy of managed growth of the School and its programs by leveraging the synergies with UCLan UK and developing programs based on the current strengths and perceived opportunity.

The assignment of duties follows the regular planning process and cycle of the university and the school. There is an annual meeting for reviewing workloads and preparing for the next academic year. The workload model is based on the 40-40-20 model, in which time is divided between education and research and with a smaller percentage with administrative duties. The assignment is interactive and takes into account the teacher's situation and plans.

Faculty research productivity is paramount. In order to facilitate this faculty-student contact hours should be monitored and perhaps reduced. Research output is a key parameter in the global university rankings.

The School of Computing has ambitions of increasing the student intake during the next years that requires the optimization of resources, especially balancing education and research activities. The School has significant potential in attracting more research funding from Horizon Europe. The integral connection with the UCLan UK can help in establishing more opportunities for international research activities and projects.

The School's three evaluated degree programs have high industry relevance and the studies support competence building by being aligned with industry certifications. The EEC values the real-life industry relevance of the degree programs; however, recommends strengthening also the research connection of the M.Sc. degree programs.

The School would benefit from more systematic scientific and industrial feedback regarding the degree programmes helping to ensure academic relevance while anticipating near-future industry needs. The

degree programs emphasize professional aspects in Computer Science and having a wider scope in this would make the degrees more relevant for the future needs of the industry. To this end, an industry advisory board is recommended as an instrument for supporting the longer-term development of the School and the degree programs.

UCLan Cyprus does not have a Ph.D. program at the moment. A number of students have continued their Ph.D. studies at UCLan UK. The EEC recommends exploring the possibilities of a joint Ph.D. program with the UK campus. This could motivate research-oriented students to choose the M.Sc. programs at UCLan Cyprus. A Ph.D. program is a very necessary instrument for supporting research in general.

The university does not have an instrument for sabbaticals. The EEC recommends developing instruments for enabling both short-term and longer-term research visits. In addition, inter-sectoral staff mobility with industry would appear to be beneficial in supporting the development and exchange of knowledge and skills building on the synergies between the academic environment and the industry.

UCLAN CYPRUS RESPONSE

We would like to once more thank the EEC members for the constructive feedback and valuable comments. The BSc Computing team is committed to continuing all the best practices identified by the EEC and capitalise on the recommendations for improvement to strengthen the programme and its market appeal.

We strongly agree with the EEC's comment that research should continue being an integral part of our strategy and aspirations, and we are committed to maintain and further strengthen our existing research environment, through the recognition, measurement and reward of research endeavours. As reflected in the School's vision, mission and strategy, this is an integral element for our future success and realisation of our long-term vision to be recognised as one of the premier science schools locally, regionally and internationally.

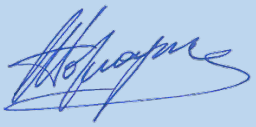
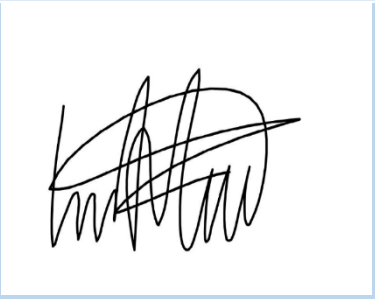
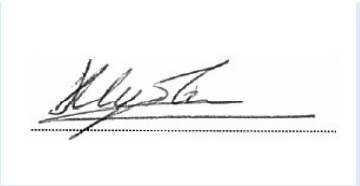
Regarding, the collaborations with UCLan UK, the BSc Computing team enjoys a beneficial ongoing collaboration with the corresponding academic team in UCLan UK, and plans to continue its successful collaboration in terms of content design and delivery. As an example, the restructuring of the programme and the newly proposed modules were designed in collaboration with the corresponding UCLan UK academic team. Additionally, we already have some examples of synergies in the delivery of knowledge. This year, we had 3 shared external guest talks from BBC and elsewhere, simultaneously streamed to the student cohorts in Preston and Cyprus. We appreciate the recommendation for exploring a joint delivery of education with UCLan UK colleagues and we are in agreement that it is a significant opportunity indeed. As we do across all academic areas, we will continue our excellent collaboration with UCLan UK, and as recommended, take further advantage of the synergies between the two campuses for the mutual benefit of the two Institutions, and specifically, with regards to the sharing of resources for enriching the teaching and research environment. As indicated by the EEC, while the current Brexit situation introduces some challenges in the collaboration of the two Institutions, at the same time, it provides a number of new opportunities on which we can capitalise. Discussions are currently taking place between the two Institutions to ensure that both, challenges and opportunities, are considered and evaluated.

We are also in agreement with the EEC that academic workload should be closely monitored and adjusted (e.g. reduce teaching workload) for academics who are highly research active. As it was observed and noted by the EEC, the process of defining the academics' yearly workload is interactive and considers each academic's individual plans, therefore it provides the necessary foundations and processes to be able to adjust the distribution of academics' time between teaching, research and administrative duties. This process is something we consider essential for the sustainability and strengthening of our research environment, and as such, we are committed in continuing. Moreover, as recommended by the EEC, a sabbatical scheme can be beneficial to allow academics further research mobilities and focus on research activities. To this end, a proposal has been made to the relevant University bodies, which responded positively. A sabbatical scheme for the University has been developed and it is currently on its final stages for approval (review/approval by the Senate). Offering our own PhD programmes is also another area of future development, which can support

and enhance our existing research environment. As per the EEC's recommendation, this has been communicated to the University and discussions are currently taking place to explore the possibility of offering joint PhD programmes between UCLan Cyprus and UCLan UK and/or independent PhD programmes by UCLan Cyprus.

With regards to the industry engagement with the School's programmes, as it is noted by the EEC, this is an integral part of our curriculum development process. Student employability is a key element embedded throughout all of our programmes, and to this end, we ensure that curriculum delivery combines research informed and industry informed teaching, which prepares graduates for diverse careers in the international market. As part of our efforts, through the years, we have established several strategically targeted industrial and academic partnerships, with depth and breadth, many of which resulted in providing students with enhanced knowledge and skills, parallel completion of professional certifications, or professional body accreditations and recognitions, which are in high demand by the industry. We do note and agree with the EEC's recommendation to formalise the contribution of our industry partners to the School and its programmes, therefore all the necessary steps have been taken to form an Advisory Board for the School. We expect that our Advisory Board will be in place and active by the start of the new academic year.

Higher Education Institution academic representatives

Name	*Position*	*Signature*
Prof. Irene Polycarpou	Head of School of Sciences Chair of School of Sciences Academic Standards and Quality Assurance Committee	
Assoc. Prof. Nearchos Paspallis	Deputy Head of School of Sciences Course Leader of BSc (Hons) Computing programme Member of School of Sciences Academic Standards and Quality Assurance Committee	
Assist. Prof. Josephina Antoniou	Course Leader of MSc Computing programme Member of School of Sciences Academic Standards and Quality Assurance Committee	
Assoc. Prof. Kalypso Iordanou	Deputy Head of School of Sciences Course Leader of BSc (Hons) Psychology Member of School of Sciences Academic Standards and Quality Assurance Committee	
Dr Cosmina Theodoulou	Chair, University Academic Standards and Quality Assurance Committee	

Date: 13/04/2021

Appendix 1

<table>
<tr><td>Course Title</td><td colspan="5">Explorations in Computing</td></tr>
<tr><td>Course Code</td><td colspan="5">CO1XXX</td></tr>
<tr><td>Course Type</td><td colspan="5">Compulsory</td></tr>
<tr><td>Level</td><td colspan="5">Level 4</td></tr>
<tr><td>Year / Semester</td><td colspan="5">Year 1/Semester 2</td></tr>
<tr><td>Teacher’s Name</td><td colspan="5">Andrie Piki, Nearchos Paspallis</td></tr>
<tr><td>ECTS</td><td>10</td><td>Lectures / week</td><td>3 hours</td><td>Laboratories / week</td><td>3 hours</td></tr>
<tr><td>Course Purpose and Objectives</td><td colspan="5">This module aims to:
Create a stimulating learning environment, inspiring students’ interest and enthusiasm for the subject of computer science and its prospects,
Introduce various exciting topics in computer science relevant to the course’s specializations,
Advance students programming skills by exposing them to engaging, visual, and interactive coding activities,
Introduce students to Object Oriented Programming principles and methodology,
Develop students’ problem-solving skills and analytical thinking – core competencies relevant to computing professionals.</td></tr>
<tr><td>Learning Outcomes</td><td colspan="5">On successful completion of this module a student will be able to:
Demonstrate familiarity with important topics of computer science and aptitude to relate them to real-world applications,
Understand and describe the underlying technologies that form the foundation of interesting computing applications,
Understand the need for Object Oriented Programming and demonstrate its application to simple programming problems,
Solve common programming challenges by selecting and applying suitable problem-solving techniques.</td></tr>
<tr><td>Prerequisites</td><td colspan="2">CO1407</td><td>Required</td><td colspan="2">None</td></tr>
<tr><td>Course Content</td><td colspan="5">The course content/topics can be grouped into themes as follows:
Software & Visualization
Week 1: Drawing colored shapes – squares, rectangles, circles, etc. (intro to OOP, visualization)
Week 2: Interacting with shapes (event-driven programming)
Week 3: Basic animations – adding movement (concurrency and threads)</td></tr>
</table>

	• Week 4: Building an Arkanoid-like game (capstone project) *Games & Graphics* • Week 5: Creating an image editor – visualize common picture formats, manipulate pixels to invert colors, remove colors and other manipulations (information encoding, graphics) • Week 6: Character animations – e.g. start with simple examples like traffic lights and proceed to how a character like Super Mario appears to run with a sequence of images, etc. (state machines and graphics) • Week 7: Creating scenes with depth perception –e.g. parallax scrolling effect (graphics) • Week 8: Platformer game (capstone) *Networks & Security* • Week 9: Password cracking – e.g. using a list of common words and a brute-force approach/dictionary attack, also encryption/decryption – e.g. Caesar's encoding (algorithms & data structures, security) • Week 10: Traveling Salesman Problem, and similar graph problems (computability & graphs & networks) • Week 11: Simulations and visualizations – e.g. compute Pi or beat the casino [if possible], Create fractals using probabilistic methods, e.g. Sierpinski triangle (probabilities, network simulations) • Week 12: Simulating a queueing system (capstone) *What lies ahead* • Week 13: The future of CS (Artificial Intelligence & Machine Learning, self-driving cars, smart assistants, computer vision, etc.) plus revision
Teaching Methodology	This module aims to interest students in the many opportunities offered by computing technology, by discussing exciting topics of computer science. At the same time, it aims to engage the students with the use of fun and modern programming assignments, involving visual feedback and enabling tinkering as a means of learning. One of the main strategies of the module is to follow an approach where first a specific problem is examined, analysing its constraints and how simple solutions fail to address it .This will serve to explain the *need* for a solution, to better justify the complexity of certain approaches (such as of Object Oriented Programming).
Bibliography	**Online Reading List:** • John M. Zelle, Python Programming: An Introduction to Computer Science, Franklin, Beedle & Associates; 3rd edition (August 8, 2016) • David Kopec, Classic Computer Science Problems in Python 1st Edition, Manning Publications; 1st edition (March 15, 2019)

<table>
<tr><td></td><td>

Wladston Ferreira Filho, Raimondo Pictet, Computer Science Distilled: Learn the Art of Solving Computational Problems, Code Energy LLC (January 17, 2017)
Eric Matthes, Python Crash Course: A Hands-On, Project-Based Introduction to Programming, No Starch Press; 2nd edition (May 3, 2019)
Eugene Gates, Computer Programming Fundamentals: 4 Books in 1: Coding For Beginners, Coding With Python, SQL Programming For Beginners, Coding HTML. A Complete Guide To Become A Programmer With A Crash Course, Independently published (September 21, 2020)

</td></tr>
<tr><td>Assessment</td><td>
The method of assessment for this module has been designed to test all the learning outcomes. Students must demonstrate successful achievement of these learning outcomes to pass the module.
<table>
<tr><th>Number of Assessments</th><th>Form of Assessment</th><th>% weighting</th><th>Size of Assessment/Duration/ Word count (indicative only)</th><th>Category of assessment</th><th>Learning Outcomes being assessed</th></tr>
<tr><td>1</td><td>PROGRAMMING ASSIGNMENT</td><td>50%</td><td>2000 words or equivalent</td><td>COURSEWORK</td><td>2, 3, 4</td></tr>
<tr><td>1</td><td>EXAM</td><td>50%</td><td>1.5 HOURS</td><td>EXAMINATION</td><td>1, 2, 3</td></tr>
</table>
For successful completion of this module a minimum aggregate mark of 40% must be achieved.
</td></tr>
<tr><td>Language</td><td>English</td></tr>
</table>

<table>
<tr><td>Course Title</td><td colspan="5">Artificial Intelligence</td></tr>
<tr><td>Course Code</td><td colspan="5">CO3519</td></tr>
<tr><td>Course Type</td><td colspan="5">Optional</td></tr>
<tr><td>Level</td><td colspan="5">Level 6</td></tr>
<tr><td>Year / Semester</td><td colspan="5">Year 4/ YL</td></tr>
<tr><td>Teacher’s Name</td><td colspan="5">Nearchos Paspallis</td></tr>
<tr><td>ECTS</td><td>10</td><td>Lectures / week</td><td>1 hours</td><td>Laboratories / week</td><td>1 hours</td></tr>
<tr><td>Course Purpose and Objectives</td><td colspan="5">This module aims to:
Introduce students to the approach and techniques of Artificial Intelligence.
Familiarise students with the techniques and algorithms that are employed in Artificial Intelligence.
Help students understand some of theoretical underpinnings of computing.</td></tr>
<tr><td>Learning Outcomes</td><td colspan="5">On successful completion of this module a student will be able to:
Explain the theoretical underpinnings of algorithms and techniques specific to artificial intelligence.
Critically evaluate the principles and algorithms of artificial intelligence.
Analyse and evaluate the theoretical foundations of artificial intelligence and computing.
Implement artificial intelligence algorithms.</td></tr>
<tr><td>Prerequisites</td><td colspan="2">CO2402</td><td>Required</td><td colspan="2">None</td></tr>
<tr><td>Course Content</td><td colspan="5">Artificial Intelligence (AI) is an important topic within Computer Science. The techniques and algorithms of AI can be applied in a variety of important ways.

This module will introduce AI in the context of computer games. Games are an ideal "toy" environment in which to explore AI techniques. The module will then move onto exploring some of theoretical underpinnings of AI and Computing.

Introduction to Artificial Intelligence
Intelligent Agents
Finite State Machines
Search algorithms. This will be done in the context of pathfinding: Breadth-First, Depth-First, Hill-Climbing, Dijkstra's algorithm, Best-First, A*
Decision Making, Conceptual Search
Advanced Artificial Intelligence</td></tr>
</table>

<table>
<tr><td></td><td>

Influence Maps
Cellular Automata
Blackboard model
Planning
Production systems
Turing Machines and computability
Machine learning
Behaviour trees
Decision trees

</td></tr>
<tr><td>Teaching Methodology</td><td>
All the AI development techniques covered will be introduced from a programming viewpoint and illustrated practically.

Lectures will present concepts illustrated with examples and will be used to direct student reading and research into relevant topics. Tutorial and practical sessions will allow students to investigate and apply the material illustrated in the lectures.

As well as reinforcing the topics covered in the lecture, tutorials will also allow the student to examine and evaluate other possible approaches to these topics. Tutorials will also include the presentation and discussion of student investigation.

In practical sessions, students will apply their general programming skills to implement, modify and explore AI algorithms.

The summative assessment uses a written examination to test the students' comprehension and application of the concepts taught to or discovered by the students and their practical skills in the application of AI algorithms and concepts through a coursework assignment that will involve implementation.
</td></tr>
<tr><td>Bibliography</td><td>
Online Reading List:

Norvig, S., Russell, P., (2016), Artificial Intelligence: A Modern Approach (3rd Edition), Pearson

</td></tr>
<tr><td>Assessment</td><td>
The method of assessment for this module has been designed to test all the learning outcomes. Students must demonstrate successful achievement of these learning outcomes to pass the module.
<table>
<tr><th>Number of Assessments</th><th>Form of Assessment</th><th>% weighting</th><th>Size of Assessment/Duration/ Word count (indicative only)</th><th>Category of assessment</th><th>Learning Outcomes being assessed</th></tr>
<tr><td>1</td><td>COURSE WORK</td><td>60%</td><td>2000 words or equivalent</td><td>COURSEWORK</td><td>1, 2, 3, 4</td></tr>
<tr><td>1</td><td>EXAM</td><td>40%</td><td>1.5 HOURS</td><td>EXAMINATION</td><td>1, 2, 3, 4</td></tr>
</table>
For successful completion of this module a minimum aggregate mark of 40% must be achieved.
</td></tr>
<tr><td>Language</td><td>English</td></tr>
</table>

Appendix 2 – Updated Programme Structure

A/A	Course Type	Course Name	Course Code	Periods per week	Period duration	Number of weeks per Academic semester	Total periods per Academic semester	Number of ECTS
Year 1: Semester 1								
1.	Compulsory	Introduction to Programming	CO1407	6	1 hour	13	78	10
2.	Optional	**Either** Study and Research Skills **Or** Academic Writing	CO1808 EF1498	3 2	1 hour	13	39 26	---
3.	Compulsory	Discrete Mathematics	MA1611	4	1 hour	13	52	---
4.	Compulsory	Introduction to Networking	CO1507	3	1 hour	13	39	---
Year 1: Semester 2								
5.	Optional	**Either** Study and Research Skills **Or** Academic Writing	CO1808 EF1498	3 2	1 hour	13	39 26	10
6.	Compulsory	Discrete Mathematics	MA1611	4	1 hour	13	52	10
7.	Compulsory	Introduction to Networking	CO1507	3	1 hour	13	39	10
8.	Compulsory	Explorations in Computing	CO1XXX	6	1 hour	13	78	10
Year 1: Semester 1 or Semester 2								
9.	Optional	University Elective	---	---	---	---	---	10

Year 2: Semester 1								
A/A	**Course Type**	**Course Name**	**Course Code**	**Periods per week**	**Period duration**	**Number of weeks per Academic semester**	**Total periods per Academic semester**	**Number of ECTS**
1.	Compulsory	The Computing Challenge	CO1111	3	1 hour	13	39	---
2.	Compulsory	Games Concepts	CO1301	3	1 hour	13	39	---
3.	Compulsory	Algorithms and Data Structures	CO1406	3	1 hour	13	39	---
4.	Compulsory	Computer Systems and Security	CO1508	3	1 hour	13	39	---
5.	Compulsory	Systems Analysis & Database Design	CO1605	3	1 hour	13	39	---
6.	Compulsory	Web Technologies	CO1706	3	1 hour	13	39	---
Year 2: Semester 2								
7.	Compulsory	The Computing Challenge	CO1111	3	1 hour	13	39	10
8.	Compulsory	Games Concepts	CO1301	3	1 hour	13	39	10
9.	Compulsory	Algorithms and Data Structures	CO1406	3	1 hour	13	39	10
10.	Compulsory	Computer Systems and Security	CO1508	3	1 hour	13	39	10
11.	Compulsory	Systems Analysis & Database Design	CO1605	3	1 hour	13	39	10
12.	Compulsory	Web Technologies	CO1706	3	1 hour	13	39	10

Year 3 – yearlong								
A/A	**Course Type**	**Course Name**	**Course Code**	**Periods per week**	**Period duration**	**Number of weeks per Academic semester**	**Total periods per Academic semester**	**Number of ECTS**
1.	Optional	Games Development 1	CO2301	2	1 hour	26	52	10
2.	Optional	Software Development	CO2401	2	1 hour	26	52	10
3.	Compulsory	Advanced Programming	CO2402	2	1 hour	26	52	10
4.	Compulsory	The Agile Professional	CO2403	2	1 hour	26	52	10
5.	Optional	Computer Graphics	CO2409	2	1 hour	26	52	10
6.	Optional	Cyber Security	CO2508	2	1 hour	26	52	10
7.	Optional	Mobile Computing	CO2509	2	1 hour	26	52	10
8.	Optional	Introduction to Network Routing	CO2511	3	1 hour	26	78	10
9.	Optional	Network Management	CO2516	3	1 hour	26	78	10
10.	Optional	Digital Evidence and Incidence Response	CO2517	2	1 hour	26	52	10
11.	Optional	Database Systems	CO2701	2	1 hour	26	52	10
12.	Optional (Sandwich Option)	Industrial Placement Year	CO2802	N/A	N/A	26	N/A	60 Notional credits

Year 4 – yearlong								
A/A	**Course Type**	**Course Name**	**Course Code**	**Periods per week**	**Period duration**	**Number of weeks per Academic semester**	**Total periods per Academic semester**	**Number of ECTS**
1.	Optional	Penetration Testing	CO3517	2	1 hour	26	52	10
2.	Optional	Games Development 2	CO3301	2	1 hour	26	52	10
3.	Optional	Maths and Technology for Games	CO3303	2	1 hour	26	52	10
4.	Optional	Advanced Software Modeling	CO3401	2	1 hour	26	52	10
5.	Optional	Artificial Intelligence	CO3519	2	1 hour	26	52	10
6.	Optional	Distributed Systems	CO3409	2	1 hour	26	52	10
7.	Optional	Advanced Network Routing	CO3513	3	1 hour	26	78	10
8.	Optional	Wireless and Mobile Networks	CO3514	2	1 hour	26	52	10
9.	Compulsory	Double Project	CO3808	1	1 hour	26	26	20
10.	Optional	Cloud Computing	CO3721	2	1 hour	26	52	10