

## **EXISTING**

**Name of Program:**                      **COMPUTER SCIENCE  
(Master of Science)**

**Degree:**                      **Master of Science**

The program provides advanced knowledge of all important fields of Computer Science, such as modern networks, database systems, algorithms and complexity and software engineering, enabling the student to delve in at least one of them.

During the development of the program the students learn how to analyze complex problems, exploit theoretical and practical advances for developing high quality solutions. At the end of the program, the student may follow a highly productive and promising career in industry or/and a successful Phd degree.

### **GENERAL OBJECTIVES:**

- To provide education leading to an academic degree, namely a Master of Science in Computer Science.
- To develop the student's capacity to think, write and speak effectively and creatively.
- To develop the student's analytical, decision-making and communication competencies together with those qualities of self-reliance, responsibility, integrity and self-awareness which will promote personal achievement and contribution to organizations.
- To obtain a good grounding in advanced topics in Computer Science through the core subjects and attain specialization through the elective courses.
- To provide the student with the advanced skills, necessary for further advancement in an academic and/or professional career.

### **SPECIFIC OBJECTIVES:**

- To intensify and deepen knowledge gained in the Bachelors programme in Computer Science.
- To prepare students for a lifetime career in industry, government and various institutions in the area of Computer Science, by establishing a foundation for lifelong learning and development.
- To ensure a learning experience which will provide students with the necessary academic and professional know-how to enter any sector of the industry as key personnel.
- To expose students to the area of scientific research and independent study and to demonstrate creativity and conduct original research work through the completion of the M.Sc. thesis in a specialized topic in the area of Computer Science.
- Analyse a problem, identify and define the computing requirements appropriate to its solution through a systematic study and research.
- Design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.
- To apply mathematical foundations, algorithmic principles, research methods and computer science theory in the modelling design and evaluation of computer-based systems in a way that demonstrates comprehension of the trade-offs involved in design choices.

### **LEARNING OUTCOMES:**

Upon successful completion of this program, the students should be able to:

- Explain and discuss principles of software engineering and software considerations for the efficient development of various computer-based systems complex systems such as critical systems, or real-time systems.

- List, describe and compare high performance CPU design implementations and their performance metrics.
- Identify and compare the different types of network topologies and kinds according to their performance and critical characteristics.
- Describe and compare key components of communication in computer networks such as routing protocols, congestion control, transmission methods and access protocols.
- Classify problems according to their hardness by mathematically prove their relation to fundamental problems of Computer Science of known complexity.
- Describe and compare multiple access, flow and error control and optimization techniques and as well as system performance measurements in networks.
- Identify requirements, apply appropriate modeling and explore various technologies and tools for developing WebApps.
- Facilitate communication between human factors engineers and computer scientists on user interface development projects.
- Analyze, design and develop database solutions by translating database modeling theory into sound database design and implementation.
- Describe and compare different models of parallel and distributed computing, basic techniques for designing algorithms in these models and write parallel programs using them.
- Describe and analyze fault tolerant systems, distributed algorithms, and multiprocessing.
- Utilize advance algorithmic techniques such as approximation and randomization techniques in order to provide algorithmic solutions of proved guarantee performance for the problems that are hard to solve.
- Apply fundamentals of discrete probability theory, the theory of Markov chains, randomized data structures, the probabilistic method, counting techniques and graph theory for modeling, design and analysis of algorithmic problems and solutions.
- Describe and discuss various issues and methods of context aware computing, 3D surface representation and surface manipulation techniques with applications in mobile phones.
- Independently identify, formulate complex problems and using appropriate scientific tools, design, implement and evaluate algorithmic solutions for them.
- Demonstrate ability to conduct in-depth research, both individually as well as in teams, in a specific Computer Science area.

#### **EMPLOYMENT OPPORTUNITIES:**

The MSc in Computer Science degree opens doors to computer careers in all kinds of companies in Cyprus and worldwide and almost all sectors of activity related to research and development in Computer Science. In particular, some of them include Project manager, Systems designer, (Mobile/Wireless) Networks, Algorithms designer and analyst, software Engineering, Data Mining, Web data mining, Graphics, Business/Systems Analysis and Data Analyst.

The holders of an MSc in Computer Science degree can also be hired in theoretical or applied research organizations and/or can continue their studies and complete a doctoral dissertation.

<b>DEGREE REQUIREMENTS</b>	<b>Credits</b>	<b>ECTS</b>
All students pursuing the Master of Science degree in "Computer Science" must complete the following requirements:		
<b>Core Courses</b>	<b>15</b>	<b>36</b>
<b>Specialization Courses</b>	<b>12</b>	<b>32</b>

<b>Master Thesis</b>	<b>3</b>	<b>22</b>
<b>Total Requirements</b>	<b>30</b>	<b>90</b>

<b>Core Courses</b>		<b>15 CR</b>	<b>36 ECTS</b>
CSC601	Advanced Software Engineering	3	8
CSC606	Database Management Systems	3	7
CSC603	Computer Networks & the Internet	3	7
CSC604	Algorithms and Complexity	3	8
CSC690	Research Methods	3	6
Master Thesis		<b>3 CR</b>	<b>22 ECTS</b>
CSC692	Master Thesis	3	22
<b><u>Specialization Courses</u></b>			
<b>The student must select four specialization courses from the following list, presented by field:</b>		<b>12 CR</b>	<b>32 ECTS</b>
<b>Software Engineering</b>			
CSC623	Web Engineering	3	8
CSC630	Advanced Human-Computer Interaction and Interface Design	3	8
<b>Computer Networks</b>			
CSC605	Distributed Computing and Parallel Processing	3	8
CSC621	Wireless and Mobile Computing	3	8
<b>Algorithms &amp; Complexity</b>			
CSC607	Approximation & Randomized Algorithms	3	8
CSC608	Graph Theory & Applications in Networks	3	8
<b>Imaging Processing &amp; Graphics</b>			
CSC626	Mobile Context Aware Computing	3	8
CSC624	Geometric Modeling	3	8
<b>Computer Architecture</b>			
CSC602	Advanced Computer Organization and Architecture	3	8

**NOTE:**

Foundation courses are required from students who lack an appropriate to the program background. Students must have completed the foundation courses or their equivalent at an accredited institution. Credits earned with foundation courses do not count towards the required coursework for the completion of the program. The Foundation courses are listed below:

<b>FOUNDATION COURSES</b>		<b>CR</b>	<b>ECTS</b>
CSC205	Data Structure and Algorithms	3	6
CSC326	Programming in Unix-like Environments	3	6
CSC327	Operating Systems	3	6
CSC331	Database Management Systems	3	6
CSC401	Theory of Computation	3	6