

## COURSE OUTLINE

### 1. GENERAL

<b>SCHOOL</b>	BUSINESS ADMINISTRATION		
<b>ACADEMIC UNIT</b>	DEPARTMENT OF CULTURAL HERITAGE MANAGEMENT AND NEW TECHNOLOGIES		
<b>LEVEL OF STUDIES</b>	UNDERGRADUATE		
<b>COURSE CODE</b>	<b>ET713</b>	<b>SEMESTER</b>	<b>7<sup>th</sup></b>
<b>COURSE TITLE</b>	ALGORITHMIC ASPECTS OF WIRELESS NETWORKS		
<b>INDEPENDENT TEACHING ACTIVITIES</b> <i>if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits</i>	<b>WEEKLY TEACHING HOURS</b>	<b>CREDITS</b>	
Lectures	3	4	
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
<b>COURSE TYPE</b> <i>general background, special background, specialised general knowledge, skills development</i>	Advanced elective (Direction of Cultural Informatics (CI))		
<b>PREREQUISITE COURSES:</b>	DISCRETE MATHEMATICS (1 <sup>st</sup> SEMESTER) INTRODUCTION TO ALGORITHMS (2 <sup>nd</sup> SEMESTER)		
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	No		
<b>COURSE WEBSITE (URL)</b>	<a href="http://goo.gl/2vveBj">goo.gl/2vveBj</a>		

### 2. LEARNING OUTCOMES

<p><b>Learning outcomes</b></p> <p><i>The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.</i></p> <p><i>Consult Appendix A</i></p> <ul style="list-style-type: none"> <li>– <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i></li> <li>– <i>Descriptors for Levels 6, 7 &amp; 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i></li> <li>– <i>Guidelines for writing Learning Outcomes</i></li> </ul> <p>Wireless and mobile communication networks critically affect almost every aspect of modern economic (e.g., electronic commerce), political (e.g., elections) and social life (e.g., contemporary social networks), i.e., our culture.</p> <p>In the context of this course we address mobile and wireless networks, such as cellular, ad hoc, wireless sensor networks (WSN). We study their fundamental characteristics together with issues related to their efficient design with emphasis on algorithmic aspects of topology control and efficient management of</p>
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critical resources (such as energy and frequency spectrum). We present applications and effects of mobile and wireless networks in cultural heritage management. We study and review modern mobile technologies placing emphasis on the design and development of mobile web and augmented reality applications.

Students who regularly participate in course activities and successfully complete the course:

- have knowledge and understanding of issues related to (i) basic characteristics of mobile and wireless networks, such as cellular, ad hoc, wireless sensor networks (WSN), (ii) their applications (especially in a cultural context) and (iii) their efficient design with emphasis on algorithmic aspects of topology control and efficient management of critical resources (such as energy and frequency spectrum)
- are able to use knowledge and understanding they have acquired in a way that shows a professional approach to their work or profession, and appropriately skilled to develop and support arguments and solve problems exploiting wireless and mobile communication networks and applications within the their field of knowledge
- have the ability to collect and interpret relevant data (typically within their field) to form judgments that include reflection on relevant social, scientific or ethical issues
- are able to communicate information, ideas, problems and solutions to specialized and non-specialized audience
- have developed knowledge acquisition skills necessary to further continue their studies with a high degree of autonomy

In particular, students who regularly participate in course activities and successfully complete the course:

1. have knowledge of (i) basic characteristics of mobile and wireless networks, such as cellular, ad hoc, wireless sensor networks (WSN), (ii) their applications (especially in a cultural context) and (iii) their efficient design with emphasis on algorithmic aspects of topology control and efficient management of critical resources (such as energy and frequency spectrum)
2. understand problems relevant to the design, implementation and applications of mobile and wireless networks
3. analyze practical problems regarding the design and implementation of mobile and wireless networks and applications on the basis of specifications and requirements in order to gain understanding of their structure and components
4. suggest solutions to these problems by using existing approaches and systems or by designing and developing new ones
5. evaluate solutions in terms of design and implementation specifications and requirements

### **General Competences**

*Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?*

*Search for, analysis and synthesis of data and information, with the use of the necessary technology*

*Adapting to new situations*

*Decision-making*

*Working independently*

*Team work*

*Working in an international environment*

*Working in an interdisciplinary environment*

*Production of new research ideas*

*Project planning and management*

*Respect for difference and multiculturalism*

*Respect for the natural environment*

*Showing social, professional and ethical responsibility and sensitivity to gender issues*

*Criticism and self-criticism*

*Production of free, creative and inductive thinking*

*.....*

*Others...*

*.....*

Search for, analysis and synthesis of data and information, with the use of the necessary technology

Adapting to new situations

Decision-making

Working independently

Team work

Working in an international environment

Working in an interdisciplinary environment

Production of new research ideas

Project planning and management

Respect for difference and multiculturalism

Respect for the natural environment

Criticism and self-criticism

Production of free, creative and inductive thinking

### 3. SYLLABUS

Wireless and mobile communication networks critically affect almost every aspect of modern economic (e.g., electronic commerce), political (e.g., elections) and social life (e.g., contemporary social networks), i.e., our culture.

In the context of this course we address mobile and wireless networks, such as cellular, ad hoc, wireless sensor networks (WSN). We study their fundamental characteristics together with issues related to their efficient design with emphasis on algorithmic aspects of topology control and efficient management of critical resources (such as energy and frequency spectrum). We present applications and effects of mobile and wireless networks in cultural heritage management. We study and review modern mobile technologies placing emphasis on the design and development of mobile web and augmented reality applications.

Lectures are scheduled as follows:

- Introduction: Course outline, objectives and role in the curriculum
- Mobile and wireless networks: preliminaries
- Networking, Data Transfer, Computer and Networking Principles, Network Categories, Mobile Wireless Networking
- Algorithms for the minimization of energy consumption in ad hoc wireless networks
- Algorithms for frequency assignment and call control in cellular wireless networks (part I, part II, part III)
- Mobile technologies - Mobile web
- Augmented Reality and Applications in Culture
- Mobile services and applications in Culture
- Wireless sensor networks: data aggregation
- Wireless & Mobile networks and Culture: influence and evolution

### 4. TEACHING and LEARNING METHODS - EVALUATION

<b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i>	Face to face, Distance learning
<b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i>	Use of ICT in teaching (online lectures, course website, extensive use of Web resources), in communication/collaboration with students (mailing lists, social networks (Facebook), course website, Doodles) and in the process of progress monitoring and evaluation (use of

	specialized software for the monitoring and evaluation of student progress)	
<p align="center"><b>TEACHING METHODS</b></p> <p><i>The manner and methods of teaching are described in detail.</i></p> <p><i>Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.</i></p> <p><i>The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</i></p>	<b>Activity</b>	<b>Semester Workload</b>
	Lectures	39
	Intense cooperation among professor and students also using ICT	8
	Independent study and work on take-home problem sets	40
	Study and analysis of bibliography	13
	Course total (25 hours per credit)	<b>100</b>
<p align="center"><b>STUDENT PERFORMANCE EVALUATION</b></p> <p><i>Description of the evaluation procedure</i></p> <p><i>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	<p>Assessment - Grading Process (it is announced on the course website before the beginning of the semester and remains available throughout the semester)</p> <p>The final score is obtained as a function of:</p> <p>(A) take-home problem sets (individual work) announced and submitted weekly on issues extensively discussed in class. Submission of solutions to these problem sets is mandatory and contributes by 40% to the final score.</p> <p><i>Non-submission of solutions or submission of solutions after the deadline or adoption of non-ethical approaches imply 0 final score (and exclusion of all course activities, i.e., problem sets, examinations during the current semester).</i></p> <p><i>Scores are valid only for the current academic year.</i></p> <p>(B) a final computer-based multiple choice examination. It contributes by 60% to the final score.</p>	

## 5. ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

WIRELESS COMMUNICATION NETWORKS AND SYSTEMS, W. Stallings, C. Beard

- Related academic journals:

Journal of Graph Theory and Applications

International Journal of Advances in Computer Science & Its Applications

International Journal of Communications, Network and System Sciences