COURSE OUTLINE

(1) GENERAL

SCHOOL	ENGINEERING		
ACADEMIC UNIT	ELECTRICAL AND COMPUTER ENGINEERING DEPT.		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**ECE_INF810**	**SEMESTER**	**8**
COURSE TITLE	UBIQUITOUS COMPUTING		

INDEPENDENT TEACHING ACTIVITIES *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*	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures	3	
Practice exercises	1	
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (4).	4	5

COURSE TYPE *general background, special background, specialised, general knowledge, skills development*	Specialised
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://www.ece.uop.gr/

(2) LEARNING OUTCOMES

Learning outcomes

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.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning*

and Appendix B

- *Guidelines for writing Learning Outcomes*

The aim of this course is to enable the future computer scientists and technologists to keep abreast of the latest and oncoming developments, across a diverse field of computing. Thus, this course interlinks several sub fields of computing, distributing computing, communication networks, artificial intelligence and human computer interaction at its core, as well as explaining and extending designs which cover mobile services, service oriented computing, sensor nets, micro electromechanical systems, context aware computing, embedded systems and robotics.

After the successful completion of the course, the students will be able to:

At the knowledge level:

- Know the fundamental characteristics of a Ubiquitous Computing system
- Define three holistic frameworks to deal with Ubiquitous Computing applications
- Explain the interdisciplinary of the Ubiquitous Computing
- Describe the basic architectural components of an emergent Ubiquitous Computing space

- Define an ambient sphere and an ambient ecology
- Understand the interaction types into a Ubiquitous Computing space
- Enumerates the required types of information of a context aware system
- Distinguish the privacy borders in a Ubiquitous Computing application

At the skill level:

- Pinpoint the components of an ambient sphere and an ambient ecology
- Specify the requirements of a Ubiquitous Computing system
- Distinct between the explicit and implicit HCI
- Corelate the required information of a context awareness application
- Separate the information regarding privacy issues

At the level of abilities:

- Compose information to produce techical reports
- Propose ideas for inovative project of the area

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	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

- Search, analysis and synthesis of data and information using appropriate tools and technology
- Adapting to new situations
- Working independently
- Team work
- Working in an interdisciplinary environment
- Production of new research ideas
- Project planning and management

(3) SYLLABUS

The course lectures cover the following thematic areas:

1. Basics and vision: Ambient Intelligence (AmI) vision, what is AmI, AmI environment, AmI system. Autonomic Computing – main concepts.
2. Ubiquitous Computing (UbiCom), holistic framework for UbiCom, core properties of UbiCom Systems. Self-* properties. Intelligent agents.
3. Inspiring scenarios for AmI, critical socio-political factors, business and industrial models, key technological requirements.
4. Ambient spheres and ecologies.
5. Modeling UbiCom applications.
6. Distributed systems and services: Distributed system viewpoints. Service architecture models – service characteristics, middleware, grid computing, peer-to-peer systems.
7. Devices and networks: Smart devices – cards. Device networks and device-service discovery. RFID tags (active-passive).
8. Sensors and sensor networks. MEMS, smart dust, other smart materials.
9. Human-Computer Interaction: Basic terms, explicit – implicit HCI. iHCI requirements.
10. Context aware computing: Concepts, views of context awareness. Context aware applications.
11. Designing and implementing context aware applications. Issues to consider when building context aware applications.

12. Privacy in Ubiquitous Computing: Defining privacy, issues to be dealt with, applications.
13. Project

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face in-class lecturing
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	• Slides of the presentation of the theoretical part of the course • Guidelines for the exercises • Suggested solutions for each exercise will be provided following the completion of each exercise • Support of teaching procedure through the e-Class platform
TEACHING METHODS *The manner and methods of teaching are described in detail.* *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.* *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*	
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *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* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Final written exam that includes: • Solving exercises • Multiple choice questions • Comparative evaluation of theory elements Practical part, exercises and solving problems Remarks: • The final grade results from the weighting of the theoretical and practical parts with weights of 60% and 40%, respectively. • The evaluation is done in the Greek language

Activity	***Semester workload***
Lectures	39
Practical examples and exercises – focusing on problem solving	13
Exercises	26
Study of lectures and bibliography	34
Project	13
Course Total	***125 hours (5 ECTS)***

(5) ATTACHED BIBLIOGRAPHY

- *Suggested bibliography:*

- S. Poslad. Ubiquitous Computing Smart Devices Environments and Interactions, John Wiley & Sons, Ltd. 2009.
- J. Krumm (Ed.) Ubiquitous Computing Fundamentals. Taylor and Francis Group, LLC, 2010.

- W. Minker, M. Weber, H. Hagras, V. Callagan, A. Kameas (Eds). Advanced Intelligent Environments, Springer, 2009.
- Selected state-of-the-art papers