1. GENERAL

SCHOOL	SCHOOL OF ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF ELECTRONICS ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	2607009	**SEMESTER**	7
COURSE TITLE	Internet of Things		

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 (ECTS)**
Lectures	2	4
Laboratory	2	
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Degree-Specific Course (SPC)
PREREQUISITE COURSES:	None
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	NO
COURSE WEBSITE (URL)	http://www.electronics.teipir.gr/index.php/en/2016-02-01-10-11-06/2016-02-01-10-12-32/undergraduate-curriculum/7th-semester

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*

Upon successful completion of this course module students possess advanced knowledge, skills and competences in the subject of Internet of Things that enable them to:

1. Comprehend the main principles of Internet of Things and in particular principles related to context and situation awareness, sensors, wireless protocols for data communication, security and privacy.
2. Search, comprehend, and analyze the corresponding standards and regulations and identify possible legal and ethical issues related to the use of IoT.
3. Research on topics related to technologies and architectures for the implementation of Internet of Things platforms.
4. Analyze scenarios for solution implementation based on Internet of Things leading to the provision of functional requirements.
5. Suggest solutions for end systems (hosts), based on the use of Internet of Things technologies and providing specifications and high-level system design.

Keywords: Internet, Communication Protocols, Security, Mobile and Portable Computing, Sensors.

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 for, analysis and synthesis of data and information, through the use of the corresponding technologies
- Working independently
- Work as a member of a team

3. COURSE CONTENT

1. Technologies, protocols and Integrated Development Environments
    - Computing systems for Internet of Things
    - Portable, mobile and wearable computing
    - Technologies and Communication Protocols
    - Addressing and Information Retrieval
    - Description and Application Development Languages
2. Operation principles and distributed computing
    - Interconnection among devices based on publish/subscribe models
    - Use of Cloud/fog computing for serving device logic execution
3. Security
    - Secure device-to-device communication over Internet
    - Computing resources and infrastructure attacks and countermeasures
    - Protocol attacks and countermeasures
    - Side channel attacks
4. Applications

Home Automations - Smart home
e-health
Smart cities
Self-driven vehicles and drones

5. Future directions and research
   Device intelligence, context, situational and self-awareness
   Ecosystem of Internet of Everything
   Social Internet of Things
   Regulatory ad Ethical Issues

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY Face-to-face, Distance learning, etc.	• Face to face lectures (Main method) • Distance learning (Auxiliary method)
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	• Use of electronic presentations with multimedia content in class • Use of applications and web programming software • Student support through the course webpage
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*	Lectures, Laboratory experiments, project and study. ***Activity*** / ***Semester workload (hours)*** Lectures: 26 Study for lectures: 26 Laboratory experiments: 26 Report on lab experiments: 13 Personal or group project related to lecture material: 13 Study and preparation for exams: 16 ***Course Total***: ***120***
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.*	Student evaluation is performed in the language of instruction. Final course grade = Lectures part grade x 60% + Laboratory part grade x 40% Lectures part grade: • Personal or group project (20%) • Final written exam (80%) Final written exam includes development questions and problem solving questions. Laboratory part grade: • Oral evaluation in the lab, on a weekly basis (10%) • Midterm project evaluation (60%) • End of term examination (30%)

5. ATTACHED BIBLIOGRAPHY

- *Recommended Books:*

1. Daniel Kellmereit, Daniel Obodovski, "The Silent Intelligence: The Internet of Things", DND Ventures LLC; 1 edition (September 20, 2013).
2. Adrian McEwen, Hakim Cassimally, "Designing the Internet of Things", Wiley; 1 edition (December 9, 2013).
3. Samuel Greengard, "The Internet of Things", The MIT Press (March 20, 2015).
4. George Loukas, "Cyber-Physical Attacks: A Growing Invisible Threat", Butterworth-Heinemann – Elsevier, 2015.
5. Lecture's Notes

-Relevant scientific journals:

- *IEEE Internet of Things Journal*
- *ELSEVIER Journal of Network and Computer Applications*