COMPUTER NETWORKS

1. GENERAL

SCHOOL	ENGINEERING
DEPARTMENT	INFORMATICS AND COMPUTER ENGINEERING
COURSE LEVEL	UNDERGRADUATE

COURSE ID		**SEMESTER**	3°

COURSE TITLE	COMPUTER NETWORKS I

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**	**ECTS**
Lectures	2	
Tutorials	1	
Labs	1	
Add rows if necessary. The organization of teaching and the teaching methods used are described in detail at 4	**4**	**5**

COURSE TYPE background, special background, specialized general knowledge, skills development	Background, Specialized general knowledge
PREREQUISITES	
LANGUAGE OF INSTRUCTION	Greek (Instruction, Examination)
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes (In English)
COURSE WEBSITE (URL)	

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 course aims to provide a deeper understanding of the basic concepts and techniques used in modern computer networks and data communications. The computer networking involves many principles, protocols and technologies that are interconnected in a complex way. Computer networking teaching is usually organized around "layers of network architecture" to understand the principles and protocols of each layer while presenting the overall picture of how all layers work together. Because the traditional bottom-up teaching approach has proven to be not the best approach for a modern computer networking lesson, the Computer Networks I lesson adopts a the bottom-up approach focusing in Internet applications, teaching from the application level and going down to the physical level.

Upon successful completion of this course the student will be able to:
- Understand the theoretical and practical aspects of computer networking and

data communications in general.
- Describe the basic functionalities of the network protocols as well as basic Internet network services.
- Use the tools and techniques required to install and operate modern data networks.
- Design and manage networks based on IP addressing (addressing, subnets, network interconnection, etc.).
- Use and configure basic network equipment (network cards, switches, etc.).

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

- Retrieve, analyze and synthesize data and information, with the use of necessary technologies
- Decision-making
- Team work
- Be critical and self-critical
- Working in an international environment

3. **DESCRIPTION**

- Introduction to computer Networks and the Internet
  - Network protocols
  - Access Networks
  - Physical Media
  - Packet/circuit switching
  - Delay, Loss and Throughput in Packer-Switched Networks
  - OSI Model
  - History of Computer Networking and the Internet
- Application Layer
  - Network Application Architectures
  - Transport Services Provided by the Internet (socket programming)
  - Processes Communicating
  - Application-Layer Protocols (HTTP, FTP, SNMP, POP3, IMAP, DNS)
- Network Layer
  - Forwarding and Routing

- The Internet Protocol (IP): IPv4, Addressing, Fragmentation, IPv6
- Network design (Subnetting, super netting, VLSM, CIDR)
- IPv6
- ICMP, DHCP, NAT
- Link Layer
  - Link-Layer Addressing and ARP
  - Ethernet
  - Link-Layer Switches
  - Virtual Local Area Networks (VLANs)
  - DHCP, UDP, IP, and Ethernet
  - Web Client-Server Interaction: TCP and HTTP

4. TEACHING AND LEARNING METHODS - EVALUATION

MODE OF DELIVERY *Face-to-face, Distance learning, etc.*	Face to face
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES *Use of ICT in teaching, laboratory education, communication with students*	• Use of ICT in Course Teaching • Use of the Open eClass system, with uploaded notes, lectures, exercises for practice and communication with students • Practical exercises based on networking equipment and software in laboratory environment.

COURSE ORGANISATION		
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	*Activities*	*Workload*
	Lectures	26
	Tutorials	13
	Labs	13
	Project	25
	Independent Study	48
	Total	**125**

ASSESSMENT *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.*	Written exams accounts for the 70% of the total mark, while performance at programming exercises accounts for the rest 30%.

5. BIBLIOGRAPHY

Suggested bibliography:

1. J.F. Kurose, K.W. Ross, "Δικτύωση Υπολογιστών, Προσέγγιση από πάνω προς τα κάτω, 6η Έκδοση 2013", Εκδόσεις: Γκιούρδα & ΣΙΑ, (Κωδ. Εύδοξος: 33094885)
2. Douglas E. Comer, "Δίκτυα και Διαδίκτυα Υπολογιστών", 2014, Εκδόσεις

Κλειδάριθμος ΕΠΕ, (Κωδ. Εύδοξος: 41960177)