COURSE OUTLINE

(1) GENERAL

SCHOOL	Engineering		
DEPARTMENT	Electrical and Computer Engineering		
LEVEL OF STUDY	Undergraduate		
COURSE UNIT CODE	6.002	**SEMESTER OF STUDY**	6th
COURSE TITLE	Computer Networks I		

COURSEWORK BREAKDOWN	**TEACHING WEEKLY HOURS**	**ECTS Credits**
Theory (Lectures)	3	3.5
Tutorial/Project	1	1
Laboratory	1	1.5
TOTAL	**5**	**6**

COURSE UNIT TYPE	Special Background / Foundation
PREREQUISITES	None
LANGUAGE OF INSTRUCTION/EXAMS	Greek
COURSE DELIVERED TO ERASMUS STUDENTS	No
WEB PAGE (URL)	https://eclass.hmu.gr/courses/ECE121/

(2) LEARNING OUTCOMES

Learning Outcomes

The course "Computer Networks I" aims to give students the necessary knowledge on how computer networks operate. The course covers theoretical and practical issues related to how computer systems are interconnected to exchange information, how they are organized within a global network, architectures and protocols used for secure data exchange, and the use of applications over networks. Particular emphasis is placed on data networks over IP and the Internet.
Upon successful completion of the course the student will be able to:
1. Understand the operation and organization of computer networks and the use of applications over them.
2. Knows the tools used to create and manage local area networks, connect computers to the Internet, and how the most common Internet protocols work.
3. Implements tools for network protocol analysis, programming and configuration of computer systems and information routing systems.
4. Analyzes and calculates the basic communication characteristics of computer systems over a local network based on internet protocols, and how they are interconnected with the public internet.
5. Proposes solutions for the installation and maintenance of computer networks, and analysis of information circulated on the Internet over popular protocols.

General Skills

- Search, analysis and synthesis of data and information, using the necessary technologies
- Adaptation to new situations
- Autonomous work
- Teamwork
- Work in an interdisciplinary environment
- Production of new research ideas

(3) SYLLABUS

Theoretical Lecture Units

- Introduction (Network Types, Internet Anatomy, Delays in packet switching networks, Encapsulation).
- Application Layer (Network Service Types and Transfer Requirements, DNS)
- Transport Layer (General Principles, Multiplexing / Demultiplexing, TCP segment, Flow and congestion control)
- Network Layer (General Principles, Internet Routing, IP datagram, Subnetting, NAT, DHCP)
- Data Link Layer (Error Detection and Correction, Multiple Link Access Mechanisms, Reliable / Unreliable Transfer Service, ARQ Mechanisms: Go-Back-N, Selective Repeat, LAN Switching Networks, Ethernet, MAC, ARP).

Laboratory Exercises

Exercises with software for network simulation and emulation:

- Static Routing - Static Route Configuration
- LAN, VLANs
- Spanning Tree Protocols
- Network management / monitoring tools

(4) TEACHING METHODS - ASSESSMENT

<table>
<tr><td>MODE OF DELIVERY</td><td>In-Class Face-to-Face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATION TECHNOLOGY</td><td>• Use of ICTs in lecturing
• Use of ICTs in laboratory-based training
• Use of ICTs for the communication with students via the e-class platform</td></tr>
<tr><td>TEACHING ORGANISATION</td><td>
<table>
<tr><th>Method description / Activity</th><th>Semester Workload</th></tr>
<tr><td>Lectures</td><td>52</td></tr>
<tr><td>Laboratory work</td><td>13</td></tr>
<tr><td>Non-guided personal study</td><td>52</td></tr>
<tr><td>Project-based assignments</td><td>50</td></tr>
<tr><td>Homework</td><td>13</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Total Contact Hours</td><td>180</td></tr>
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<tr><td>ASSESSMENT METHODS</td><td>Language of Assessment
Greek

Student assessment methods
1. Written final examination (45%)
• with exercises
• with multiple choice questions
2. teamwork assignment for the theoretical part of the course (with written report and oral assessment) (20%).
3. teamwork assignment for the laboratory part of the course (with written report and oral assessment) (20%).
4. Homeworks (15%).

The course evaluation criteria are announced to the students at the beginning of the semester and are posted on the course website in eClass.</td></tr>
</table>

(5) RECOMMENDED BIBLIOGRAPHY

- Recommended Bibliography:

1. *Computer Networking: Top-down approach, J.F. Kurose, K.W. Ross, Εκδόσεις Μ. Γκιούρδας, ISBN: 978-960-512-6575.*
2. *Compuer Networks, A. Tanenbaum, 4η Έκδοση, Εκδόσεις Παπασωτηρίου, ISBN 960-7510-70-4.*
3. *Olivier Bonaventure, "Computer Networking: Principles, Protocols and Practice", Release 0.25.*
4. *Ying-Dar Lin, Ren-Hung Hwang, Fred Baker, "Computer Networks An Open Source Approach", McGraw-Hill Higher Education, 2012.*

- Relevant Scientific Journals:

- *IEEE Communications Surveys and Tutorials*

- *IEEE Communications Magazine*
- *IEEE Journal on Selected Areas in Communications*
- *IEEE Network*
- *Elsevier Computer Networks*
- *IEEE Access*