COMPUTER NETWORKS II

1. GENERAL

SCHOOL	ENGINEERING		
DEPARTMENT	INFORMATICS AND COMPUTER ENGINEERING		
COURSE LEVEL	UNDERGRADUATE		
COURSE ID		**SEMESTER**	4°
COURSE TITLE	COMPUTER NETWORKS II		

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	COMPUTER NETWORKS I, COMPUTER PROGRAMMING
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 is a continuation of the basic introductory course "Computer Networks I" and aims to deepen students' knowledge in the two most important application-level levels of today's networks, namely at the network and transport level.
The students learn the most common routing techniques and protocols that dominate the transport level. The course provides an in-depth study of the fundamentals of computer networking through the architecture and protocols of the Internet focusing on the router, the protocols and the provided services.
The course follows by an integrated approach which combines traditional teaching with hands-on practical exercises in the laboratory environment.

Upon successful completion of this course the student will be able to:
- Understand the operation of modern routing techniques in today's and future networks
- Understand the differences between the IPv4 and IPv6 routing.
- Understand the content of packet and segment headers.
- Use TCP, UDP transport technologies and be able to select between them based

	on each application requirements

- Understand the concepts of flow control, congestion, performance, quality of service, transport reliability
- Use tools and devices (routers and customization software, packet sniffers, system commands, socket programming, 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 *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...* *.......*

- 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

- Network Layer
  - Routing Algorithms
  - The Link-State (LS) Routing Algorithm
  - The Distance-Vector (DV) Routing AlgorithmIPv6
  - Routing in the Internet: OSPF, BGP, RIP
  - The Dynamic Host Configuration Protocol
  - Network Address Translation (NAT)
  - Innovative routing approaches (SDN)
- Transport Layer
  - Transport Layer in the Internet
  - UDP Segment Structure
  - Reliable Data Transfer Protocol
  - Go-Back-N (GBN)/ Selective Repeat (SR)
  - The TCP Connection
  - Flow and Congestion Control
  - Introduction to network programming

4. TEACHING AND LEARNING METHODS - EVALUATION

MODE OF DELIVERY *Face-to-face, Distance learning, etc.*	Face to face
USE OF INFORMATION AND	- Use of ICT in Course Teaching

COMMUNICATION TECHNOLOGIES _Use of ICT in teaching, laboratory education, communication with students_	• 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. Kurose, James, and Keith Ross. "Computer networks: A top down approach featuring the internet." (2016).
2. Douglas, E. Comer. "Computer networks and Internets." (2015).