ADVANCED NETWORK TECHNOLOGIES

(1) GENERAL

SCHOOL	ENGINEERING		
ACADEMIC UNIT	INFORMATICS AND COMPUTER ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	ICE-7301	**SEMESTER**	7TH / 9TH
COURSE TITLE	ADVANCED NETWORK TECHNOLOGIES		

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	Specialised General Knowledge, Skills Development
PREREQUISITES	Computer Networks I, Computer Networks II
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 deepen the students' knowledge in topics which relate to advanced network technologies and protocols for designing core and access networks, as well as wide area and metropolitan networks. In detail, thorough study exists on algorithms, protocols, technologies, and mechanisms that are utilised for designing and operating new-generation telecommunication networks, as well as on issues which relate to quality of service (QoS) and service level agreement (SLA). Upon successful completion of this course, the students will be able to understand and comprehend various network architectures, technologies and protocols which are utilised for developing new-generation telecommunication networks.

Learning outcomes:

- Familiarise with new-generation telecommunication networks technologies and architectures. In detail, core/access networks, wide-area, and metropolitan networks
- Gain specialised knowledge on advanced concepts for designing network architectures from a techno-economical perspective comprising interoperability issues with the underlying networks
- Understand, comprehend, deepen, and combine knowledge for configuring and managing network machinery in advanced core networks
- Resolve advanced problems by comprehending and utilising knowledge on every network

equipment, as well as on performance optimisation in traffic engineering, and in routing/switching case studies
- Benefit elevated knowledge on methodological approaches which may offers to continue their study path in an autonomous manner

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…
	…….

- Work independently / Teamwork
- Retrieve, analyse and synthesise data and information by utilising necessary technologies
- Decision-Making
- Advance of new research ideas
- Advance of free, creative, and inductive thinking

(3) SYLLABUS

- Routing Algorithms and Congestion Control: Synchronous/Asynchronous routing algorithms, Optimal Routing, Flow and Congestion Control
- Internet Routing: Interior Gateway Protocols (IGP) and Exterior Gateway Protocol (EGP), OSPF and BGP
- Internet Multicast: Internet Group Management Protocol (IGMP), Distance Vector Multicast Routing Protocol (DVMRP), Protocol Independent Multicast (PIM)
- Quality of Service Mechanisms: IntServ and DiffServ mechanisms, Resource Reservation Protocol (RSVP)
- Service Level Agreements (SLAs): Motivation, Impact, Role, and Context
- Multiprotocol Label-Switching (MPLS): Traffic Engineering, VPN
- Carrier Ethernet: VPLS service, E-Lan/E-Tree/E-Line, Metro Ethernet

(4) TEACHING AND LEARNING METHODS – EVALUATION

DELIVERY Face-to-face, Distance learning, etc.	Face to face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY Use of ICT in teaching, laboratory education, communication with students	• Use of ICT in Course Teaching • Use of the Open eClass learning-management system, for distributing lecture notes, exercises for practice and for communicating with the students
TEACHING METHODS The manner and methods of teaching are described in detail. Lectures, seminars, laboratory	**Activity** / **Semester workload** Lectures / 26

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	<table><tr><td>Tutorials</td><td>13</td></tr><tr><td>Laboratory practice</td><td>13</td></tr><tr><td>Project</td><td>25</td></tr><tr><td>Independent Study</td><td>48</td></tr><tr><td></td><td></td></tr><tr><td>Course total</td><td>125</td></tr></table>
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.	**I.** Written exams (accounts 75% of the total course mark) which consist of: - Short answer questions - Multiple choice questions - Real-life problems resolution **II.** Laboratory Work (accounts 25% of the total course mark) For successfully qualifying the course, a minimum grade of 5.0 marks (of 10 in total) is mandatory in the written exams.

(5) ATTACHED BIBLIOGRAPHY

Suggested bibliography:

1. A. S. Tanenbaum, D. J. Wetherall, “Computer Networks”, 6th edition, Prentice-Hall.
2. W. Stallings, “Data and Computer Communications”, 6th edition, Prentice-Hall.
3. I. Venieris, “Δίκτυα Ευρείας Ζώνης” [Wide Area Networks], 3rd edition, A.Tziola.
4. Rajiv Ramaswami, Kumar Sivarajan, Galen Sasaki, “Optical Networks: A Practical Perspective”, 3rd Edition, Morgan Kaufmann.