

COURSE OUTLINE

(1) GENERAL

SCHOOL	ENGINEERING		
ACADEMIC UNIT	INFORMATICS AND COMPUTER ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE		SEMESTER	8 th
COURSE TITLE	TELECOMMUNICATION SYSTEMS		
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	
Lectures	3		
Practice Exercises	1		
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).	4	5	
COURSE TYPE general background, special background, specialised general knowledge, skills development	Specialised general knowledge Skills development		
PREREQUISITE COURSES:	Computer Networks I & II		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
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 introduces students to the basic theory and technologies of broadband networks. Although students have been taught many topics of wide area communication networks across the range of levels in the courses "Networks I", "Networks II", this course attempts to analyse in depth topics addressed to students who have chosen the field of Networks Computer and communications. The course focuses on the degree of bandwidth of all modern communication systems and the most sophisticated techniques for achieving it at the physical and access levels. The course also deals with the broadband services that support modern broadband networks and the progress of broadband in Greece. Upon completion of the course students will be able to understand and appreciate the techniques and protocols that achieve broadband across all the dominant network models that make up the internet.

The learning objectives of the course are the following:

- To familiarize the students with the technologies (wireless, wired, optical) that are used nowadays to achieve broadband.
- For students to acquire the skills required to be able to assess the performance of a broadband communications system from the point of view of the infrastructure as well as the supported services.
- Students should be able to understand the role of each component of a modern broadband network, as well as network optimization issues with the aim of acquiring

the ability to solve problems in real broadband network environments, but also to produce research and innovation in the field of broadband networks and services.

- For the students to acquire a deep understanding and knowledge of the course of broadband in Greece so that they can play a leading role in shaping the business models that will be chosen in the future.

The aforementioned learning objectives of the course are achieved in the following ways:

- Presenting to the students the architectures of existing broadband area networks, such as xDSL network of Greek providers.
- Presenting to the students real case studies regarding the upgrading of existing networks, making use of modern technologies and protocols.
- Using various teaching techniques such as brainstorming, case studies, question-and-answer, discussion, enriched lecture and simulation, techniques which are consistent with both the basic principles of adult education and the scientific approach framework and processing issues related to new technologies.

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, analysis and synthesis of data and information, using the necessary technologies
 Decision making
 Autonomous work
 Group work
 Promotion of free, creative and inductive thinking
 Project planning and management
 Generating new research ideas

(3) SYLLABUS

The theoretical part of the course is proposed to include the following teaching modules:

- Definition of broadband
- Presentation of main characteristics of basic broadband systems

Wired Technologies: xDSL, DMT technique, bit loading technique, presentation of DSLAM and its network connection to the internet

- Wireless technologies: 4G, LTE, WiMax (CDMA, OFDM, DFT spread techniques), satellite communications

- Optical fiber networks – passive optical networks, FFTx

- Broadband access over power lines

- Broadband Content Services

- E-learning

- E-health

- E-government

- E-commerce

- E-gaming

- Broadband in Greece

- Academic Networks (EDET, GUnet)

- Connection Network
- Provider Networks, GR-IX
- Presentation of special topics of broadband systems
 - Data centres
 - Convergence of wireless and wired networks
 - Broadband and its carbon footprint
 - Techno-economic issues of broadband networks – business models for utilizing broadband infrastructures.

Laboratory Part of the Course

To carry out the laboratory part of the course, it is recommended to use specialized simulation software (e.g. OMNET, Matlab)

(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	<ul style="list-style-type: none"> • Posting material of the theoretical part of the course (notes, lecture slides, exercises, exam topics, etc.) on the e-learning platform (e-class). • Use of e-mail and announcements on the e-learning platform to communicate with students 												
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	<table border="1"> <thead> <tr> <th style="background-color: #e0e0e0;">Activity</th> <th style="background-color: #e0e0e0;">Semester workload</th> </tr> </thead> <tbody> <tr> <td>Lectures</td> <td>39</td> </tr> <tr> <td>Practice Exercises</td> <td>13</td> </tr> <tr> <td>Group and Individual Studies/Assignments</td> <td>25</td> </tr> <tr> <td>Independent Study</td> <td>48</td> </tr> <tr> <td>Total Course (25 workload hours per credit unit)</td> <td>125</td> </tr> </tbody> </table>	Activity	Semester workload	Lectures	39	Practice Exercises	13	Group and Individual Studies/Assignments	25	Independent Study	48	Total Course (25 workload hours per credit unit)	125
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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.	<p>I. Written final exam (75%) including:</p> <ul style="list-style-type: none"> • Short answer questions • Multiple choice questions • Problem solving • Comparative evaluation of theory elements <p>II. Assessment of individual and group assignments (25%)</p>												

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

1. Internet Technologies, Douligieris X., Mavropodi R., Kopanaki E. ISBN 978-960-6759-90-1
2. Computer Networks, 5th edition, Prentice-Hall, Tanenbaum S. Andriew, David J. Wetherall, ISBN 978-0132126953
3. Computer and Data Communications, Sixth Edition, Stallings William, ISBN 960-8050-54-5
4. Broadband Networks, 3rd Edition, A. Tziola Publications, Venieris Iakovos S., ISBN 978-960-418-203-9
5. 5. Optical Networks: A Practical Perspective, 3rd Edition, Rajiv Ramaswami, Kumar Sivarajan, Galen Sasaki, ISBN 978-0123740922.
6. B. Sklar, N. Mitrou, Digital communications, Papatotiriou publications, (2011)

