

COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF ELECTRONICS ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	2607002	SEMESTER	7
COURSE TITLE	Mobile Communications – Telecommunication Networks		
INDEPENDENT TEACHING ACTIVITIES <i>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</i>	WEEKLY TEACHING HOURS	CREDITS (ECTS)	
Lectures	4	7	
Laboratory	2		
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	Specialisation Course		
PREREQUISITE COURSES:	None		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	NO		
COURSE WEBSITE (URL)	http://www.electronics.teipir.gr		

(2) LEARNING OUTCOMES

<p>Learning outcomes</p> <p><i>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.</i></p> <p><i>Consult Appendix A</i></p> <ul style="list-style-type: none"> • <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i> • <i>Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i> • <i>Guidelines for writing Learning Outcomes</i>
<p>Upon successful completion of this course module students possess advanced knowledge, skills and competences in the subject of Mobile Communications and Telecommunication Networks that enable them to:</p> <ol style="list-style-type: none"> 1. Describe the network architecture and the key protocols involved in the major mobile communication networks: GSM-GPRS-3G WCDMA-4G LTE, 802.11 WLAN networks. 2. Describe and Explain the key network design and Operation-Maintenance principles of GSM-GPRS-3G WCDMA-4G LTE, 802.11 WLAN networks. 3. Analyze basic network design & Operation-Maintenance issues that apply in GSM-GPRS-3G WCDMA-4G LTE, 802.11 WLAN networks. 4. Develop solutions for basic design and Operation – Maintenance study cases that may apply in GSM-GPRS-3G WCDMA-4G LTE, 802.11 WLAN networks.

5. Describe the network architecture and the key protocols involved in the PSTN/ISDN Telephony networks.
6. Describe and Explain the key network design and Operation-Maintenance principles of PSTN/ISDN Telephony networks.
7. Analyze basic network design & Operation-Maintenance issues that apply in PSTN/ISDN Telephony networks.
8. Develop solutions for basic design and Operation – Maintenance study cases that may apply in PSTN/ISDN Telephony networks.
9. Describe the network architecture and the key protocols involved in the LAN/WAN networks.
10. Describe and Explain the key network design and Operation-Maintenance principles of LAN / WAN networks.
11. Analyze basic network design & Operation-Maintenance issues that apply in LAN / WAN networks.
12. Develop solutions for basic design and Operation – Maintenance study cases that may apply in LAN /WAN networks.
13. Describe and explain the network and protocol architecture of VoIP networks.

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?

<i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i>	<i>Project planning and management</i>
<i>Adapting to new situations</i>	<i>Respect for difference and multiculturalism</i>
<i>Decision-making</i>	<i>Respect for the natural environment</i>
<i>Working independently</i>	<i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i>
<i>Team work</i>	<i>Criticism and self-criticism</i>
<i>Working in an international environment</i>	<i>Production of free, creative and inductive thinking</i>
<i>Working in an interdisciplinary environment</i>	<i>.....</i>
<i>Production of new research ideas</i>	<i>Others...</i>
	<i>.....</i>

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Working independently
- Team work

(3) COURSE CONTENT

Lectures

Mobile Communications module part includes:

- a) Overview of mobile radio channel characteristics,
- b) Cellular coverage principles
- c) Multiple Access Techniques
- d) GSM-GPRS-3G WCDMA Network & Protocol Architecture
- e) WLAN Network & Protocol Architecture
- f) Wireless Network trends (LTE, WMAN, WPAN).

Telecommunication Networks module part includes:

- a) a)Telecommunication Network Principles & Terms,
- b) b)Digital Telephony Networks,
- c) LAN/MAN/WAN Data Networks

d) VoIP Networks

Laboratory Experiments

1. Digital Telephony: PBX Operation & Maintenance.
2. Trunk Signaling: SS7-ISUP
3. GSM Air Interface Physical Layer Measurements
4. GSM Air Interface Layer 3 (CM, MM, RRM) Signaling Sequences and Messages
5. LAN / WAN HW Infrastructure - Operation & Maintenance Tasks (Routers / Switches)
6. WLAN HW Infrastructure - Operation & Maintenance Tasks

(4) TEACHING and LEARNING METHODS - EVALUATION

<p style="text-align: center;">DELIVERY <i>Face-to-face, Distance learning, etc.</i></p>	Face to face lectures														
<p style="text-align: center;">USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i></p>	<ul style="list-style-type: none"> • Use of electronic presentation with multimedia content in class, • Student support through the course webpage and the departmental e-learning platform, • Electronic communication of instructors and students, through the course webpage and by e-mail. • Use of GSM networks measurements and performance software • Use of digital telephone centers (PBX) management software • Use of data network equipment management software • Use of industrial infrastructure telecom equipment and software (PBXs, switches, routers, etc.) • Use of trunk and subscriber part signaling analysis software. 														
<p style="text-align: center;">TEACHING METHODS <i>The manner and methods of teaching are described in detail.</i> <i>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.</i></p> <p><i>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</i></p>	<p>Lectures, Laboratory experiments, assignments, study.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Activity</th> <th style="text-align: center;">Semester workload (hours)</th> </tr> </thead> <tbody> <tr> <td>Lectures</td> <td style="text-align: center;">52</td> </tr> <tr> <td>Study for lectures</td> <td style="text-align: center;">78</td> </tr> <tr> <td>Laboratory experiments</td> <td style="text-align: center;">26</td> </tr> <tr> <td>Report on lab experiments – assignments</td> <td style="text-align: center;">26</td> </tr> <tr> <td>Study and preparation for exams</td> <td style="text-align: center;">28</td> </tr> <tr> <td>Course Total</td> <td style="text-align: center;">210</td> </tr> </tbody> </table>	Activity	Semester workload (hours)	Lectures	52	Study for lectures	78	Laboratory experiments	26	Report on lab experiments – assignments	26	Study and preparation for exams	28	Course Total	210
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<p style="text-align: center;">STUDENT PERFORMANCE EVALUATION <i>Description of the evaluation procedure</i></p> <p><i>Language of evaluation, methods of evaluation, summative or conclusive, multiple</i></p>	<p>Final grade = Theory part grade x 60% + Lab part grade x 40%</p> <p><i>Theory Part grade:</i></p>														

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.

- Final exam (100%)

Final exam includes development questions and computational / problem solving questions.

Lab part grade:

- Oral evaluation on lab reports
- Oral evaluation on lab participation
- Report plan prior evaluation
- Written exam on three groups of lab experiments

(5) ATTACHED BIBLIOGRAPHY

Essential Reading

1. STALLINGS, W. (2005), Wireless Communications and Networks, Pearson Education International.
2. STALLINGS, W. (2000), Data Computer Communications, Prentice Hall.
3. FREEMAN, R.L. (2005), Fundamentals of Telecommunication, John Wiley & Sons.

Recommended Reading

1. BERTONI, H.L. (2000), Radio Propagation for Modern Wireless Systems, Prentice Hall.
2. LEE, W.C. (1998), Mobile Communications Engineering, McGraw-Hill,.
3. LEE, W.C. (1995), Mobile Cellular Telecommunications, McGraw-Hill.
4. RAPPAPORT, T., Wireless Communications, Prentice Hall.
5. SAUNDERS, S. R. (1999), Antennas and Propagation for Wireless Communication Systems, John Wiley & Sons.
6. SCHILLER, J. (2003), Mobile Communications, Addison Wesley.