

## COURSE OUTLINE

### (1) GENERAL

<b>SCHOOL</b>	School of Science		
<b>ACADEMIC UNIT</b>	Physics		
<b>LEVEL OF STUDIES</b>	Undergraduate		
<b>COURSE CODE</b>	<b>10EK203</b>	<b>SEMESTER</b>	<b>8</b>
<b>COURSE TITLE</b>	<b>Telecommunications</b>		
<b>INDEPENDENT TEACHING ACTIVITIES</b> <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>		<b>WEEKLY TEACHING HOURS</b>	<b>CREDITS</b>
Lectures (theory and exercises) and Laboratory practice		4	6
<b>COURSE TYPE</b> <i>general background, special background, specialised general knowledge, skills development</i>	Specialised Knowledge		
<b>PREREQUISITE COURSES:</b>	No		
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	No		
<b>COURSE WEBSITE (URL)</b>	<a href="https://eclass.uoa.gr/courses/PHYS257/">https://eclass.uoa.gr/courses/PHYS257/</a>		

## (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

In this course the student acquires the necessary knowledge for the understanding of the operation of analogue and digital telecommunications systems and the functions they comprise including modulation, digitisation and signal transmission over a communication channel.

With the completion of the course the student is able to:

**A.** Describe the generic operation of telecommunications systems. Define the generic functions of telecommunications systems and their structural elements and combine these appropriately to achieve the required system operation and performance.

**B.** Explain the principle of operation of different telecommunications systems and evaluate their suitability for a variety of applications. Examine the efficiency of these systems and classify these according to their performance for a range of operation parameters.

**C.** Combine functions and construction elements, in order to design telecommunications systems with given specifications. Develop relevant mathematical models to evaluate these systems. Compare different systems and propose optimal solutions regarding their operation and performance.

### 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...  
.....

The course aims at the following general competences

- 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
- Showing social, professional and ethical responsibility and sensitivity to gender issues
- Production of free, creative and inductive thinking
- Analytical and synthetic thinking
- Critical thinking
- Time management
- Planning
- New Technology skills
- Information management

- Meeting Deadlines and Keeping Schedules
- Flexibility / Adaptability
- Problem solving

### **(3) SYLLABUS**

- Description of telecommunications systems
- Analogue modulation
- Sampling and pulse modulation
- Pulse code modulation (PCM) systems
- Digital Modulation
- Propagation channel characteristics
- Laboratory experiments

#### (4) TEACHING and LEARNING METHODS - EVALUATION

<p><b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i></p>	Face-to-face	
<p><b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i></p>	<p>Yes</p> <p>Electronic communication with the students using ICT (Information and Communications Technology) Computer-aided lectures, use of Overhead Projectors, eclass platform</p>	
<p><b>TEACHING METHODS</b> <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>	<b>Activity</b>	<b>Semester workload</b>
	Lectures/ exercises	<p>10 weeks X 4 hrs/week =40 hrs 3 weeks X 2 hrs/week =6 hrs</p>
	Individual Study/ Study and Analysis of bibliography / Preparation	83 hrs
	Laboratory practice	3 weeks X 2 hrs/week= 6 hrs
	Writing reports/ essays	12hrs
	Written exam	3
<b>Course Total</b>	<b>150</b>	
<p><b>STUDENT PERFORMANCE EVALUATION</b> <i>Description of the evaluation procedure</i></p> <p><i>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</i></p> <p><i>Specifically defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	<p>Final written exams in Greek. Oral examination during lectures and laboratory sessions. Laboratory reports.</p>	

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*

- Communications Systems, 5η edition, S. Haykin & M. Moher, Εκδόσεις Παπασωτηρίου και ΣΙΑ ΙΚΕ, 2010, Αθήνα, Κωδικός Εύδοξου 9778
- Introduction to Telecommunications, Αθανάσιος Κανάτας, Εκδόσεις Τζιόλα, 2017, Αθήνα, Κωδικός Εύδοξου 68473981

*- Related academic journals:*

IEEE Journal of Communications and Networks  
IEEE Communications Letters  
IEEE Communications Magazine  
IEEE Transactions on Communications  
IEEE Transactions on Information Theory  
IEEE Journal on Selected Areas in Communications  
IEEE Wireless Communications Letters  
IEEE Wireless Communications  
IEEE Transactions on Wireless Communications  
IEEE Journal of Optical Communications and Networking