

## COURSE OUTLINE

### (1) GENERAL

<b>SCHOOL</b>	ENGINEERING		
<b>ACADEMIC UNIT</b>	DEPT. OF COMPUTER ENGINEERING AND INFORMATICS		
<b>LEVEL OF STUDIES</b>	UNDERGRADUATE		
<b>COURSE CODE</b>	CEID_NE5127	<b>SEMESTER</b>	Fall (elective)
<b>COURSE TITLE</b>	ALGORITHMS FOR COMMUNICATION SYSTEMS		
<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, Recitation sections, Laboratory exercises		2(L), 2(rc), 1(le)	5
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			5
<b>COURSE TYPE</b> <i>general background, special background, specialised general knowledge, skills development</i>	Skills development		
<b>PREREQUISITE COURSES:</b>	There are no prerequisite courses. It is recommended that students have knowledge of "Introduction to Algorithms" (CEID_NY205)		
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	Yes		
<b>COURSE WEBSITE (URL)</b>	<a href="https://eclass.upatras.gr/courses/CEID1145/">https://eclass.upatras.gr/courses/CEID1145/</a>		

### (2) LEARNING OUTCOMES

<p><b>Learning outcomes</b> <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"> <li>• <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i></li> <li>• <i>Descriptors for Levels 6, 7 &amp; 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i></li> <li>• <i>Guidelines for writing Learning Outcomes</i></li> </ul>								
<p>With the successful completion of this course, students will:</p> <ol style="list-style-type: none"> <li>1. Be familiar with fundamental notions of communication protocols.</li> <li>2. Have understood key topologies of interconnection networks.</li> <li>3. Be familiar with fundamental concepts in worst-case analysis for routing protocols in fixed connection networks.</li> <li>4. Have understood routing protocols in Internet-like networks.</li> <li>5. Be able to formulate simple lower bounds on the performance of routing algorithms based on topological properties.</li> </ol>								
<p><b>General Competences</b> <i>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></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"><i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i></td> <td style="width: 50%; border: none;"><i>Project planning and management</i></td> </tr> <tr> <td style="border: none;"><i>Adapting to new situations</i></td> <td style="border: none;"><i>Respect for difference and multiculturalism</i></td> </tr> <tr> <td style="border: none;"></td> <td style="border: none;"><i>Respect for the natural environment</i></td> </tr> <tr> <td style="border: none;"></td> <td style="border: none;"><i>Showing social, professional and ethical responsibility and</i></td> </tr> </table>	<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>Respect for the natural environment</i>		<i>Showing social, professional and ethical responsibility and</i>
<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>Respect for the natural environment</i>							
	<i>Showing social, professional and ethical responsibility and</i>							

<i>Decision-making</i>	<i>sensitivity to gender issues</i>
<i>Working independently</i>	<i>Criticism and self-criticism</i>
<i>Team work</i>	<i>Production of free, creative and inductive thinking</i>
<i>Working in an international environment</i>	.....
<i>Working in an interdisciplinary environment</i>	<i>Others...</i>
<i>Production of new research ideas</i>	.....

  

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Decision-making
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### (3) SYLLABUS

- Packet routing
- Greedy algorithm in meshes - Worst case analysis
- Greedy algorithm in butterflies and hypercubes - Worst case analysis
- Average case analysis of greedy algorithms
- Randomized algorithms for packet routing
- Routing in Internet-like networks
- The small-world phenomenon

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

<b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i>	Face to face	
<b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i>	Use of ICT in teaching (online lectures, course website, extensive use of Web resources) and in communication/collaboration with students (mailing lists, course website)	
<b>TEACHING METHODS</b> <i>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</i>	<b>Activity</b>	<b>Semester Workload</b>
	Lectures	26
	Recitation sections	26
	Laboratory exercises	13
	Independent study	39
	Study and analysis of bibliography	26
	Course total (25-30 hours per credit)	<b>130</b>
<b>STUDENT PERFORMANCE EVALUATION</b> <i>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</i>	Oral examination/public presentation (50%) Problem solving homework (50%)	

*examination of patient, art interpretation,  
other*

*Specifically-defined evaluation criteria are  
given, and if and where they are  
accessible to students.*

**(5) ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography:*

F. T. Leighton. Introduction to parallel algorithms and architectures. Morgan Kaufmann Pub.  
D. Easley, J. Kleinberg. Networks, crowds and markets. Cambridge University Press.