

## MODULE OUTLINE

### 1. GENERAL INFORMATION

<b>SCHOOL</b>	SCHOOL OF SCIENCE AND TECHNOLOGY		
<b>PROGRAM COURSE</b>	INFORMATICS		
<b>LEVEL OF STUDY</b>	UNDERGRADUATE		
<b>MODULE CODE</b>	PLI-36	<b>YEAR OF STUDY</b>	4 <sup>th</sup>
<b>MODULE TITLE</b>	Advanced Networks and Services		
<b>INDEPENDENT TEACHING ACTIVITIES</b> <i>in case credits are awarded for separate components/parts of the course, e.g. in lectures, laboratory exercises, etc. If credits are awarded for the entire course, give the weekly teaching hours and the total credits</i>		<b>HOURS</b>	<b>CREDIS</b>
Weekly teaching hours * 32 weeks		16-18	20 ECTS
<b>COURSE TYPE</b> <i>Background knowledge, Scientific expertise, General Knowledge, Skills Development</i>	Scientific expertise, Optional		
<b>PREREQUISITE MODULES:</b>	No		
<b>LANGUAGE OF INSTRUCTION AND EXAMS</b>	GREEK		
<b>THE MODULE IS OFFERED TO ERASMUS STUDENTS</b>	No (due to annual duration of the module)		
<b>MODULE WEBSITE (URL)</b>	<a href="https://www.eap.gr/education/undergraduate/computer-science/topics/#sinxrona_diktia">https://www.eap.gr/education/undergraduate/computer-science/topics/#sinxrona_diktia</a>  Each module has its own space in the Learning Management System of EAP ( <a href="http://study.eap.gr">http://study.eap.gr</a> ), with controlled access (use of code) for students and teaching staff.		

### 2. LEARNING OUTCOMES

<p><b>Learning Outcomes</b></p> <ul style="list-style-type: none"> <li>The course learning outcomes, specific knowledge, skills and competences of an appropriate (certain) level, which students will acquire upon successful completion of the course, are described in detail. It is necessary to consult:</li> </ul>
<p>The first pillar refers to a generic networks knowledge consisting in:</p> <ul style="list-style-type: none"> <li>IP and TCP networking protocols</li> <li>Ethernet networks</li> <li>Interconnection of networks with switches and routers</li> </ul>

- IP packet analysis focusing on the concepts of segmentation and addressing.
- IPv6 and IPsec protocols.
- Basic procedures and the basic routing algorithms (such as Bellman – Ford and Dijkstra), intra-sectoral (RIP and OSPF) and cross-sectoral routing (BGP).

Regarding the second pila of basic network design, the students:

- will know how to utilize the different types of networks, the basic network architectures and the corresponding design tools.
- will know the basic network analysis captured by M/M/, M/G/1 and Erlang models.
- will understand concepts such as bridging, minimum overlapping tree, shortest path and capacity allocation based on flows.

With the successful completion of the third axis, i.e., advance network beyond IP design and services, the students:

- will acquire knowledge about photonics, wireless, mobile and satellite networks.
- will gain knowledge about services application frameworks.

It is important to note that the three pillars of theoretical background is complemented by learning how to handle appropriate open source tools related with network design and analysis.

### **General Competences**

*Taking into consideration the general competences that students/graduates must acquire (as those are described in the Diploma Supplement and are mentioned below), at which of the following does the course attendance aim?*

<i>Search for, analysis and synthesis of data and information by the use of appropriate technologies,</i>	<i>Project planning and management</i>
<i>Adapting to new situations</i>	<i>Respect for diversity and multiculturalism</i>
<i>Decision-making</i>	<i>Environmental awareness</i>
<i>Individual/Independent work</i>	<i>Social, professional and ethical responsibility and sensitivity to gender issues</i>
<i>Group/Team work</i>	<i>Critical thinking</i>
<i>Working in an international environment</i>	<i>Development of free, creative and inductive thinking</i>
<i>Working in an interdisciplinary environment (Other.....citizenship, spiritual freedom, social</i>	<i>.....</i>
<i>Introduction of innovative research</i>	<i>awareness, altruism etc.) .....</i>

Application of knowledge in practice  
 Search for, analysis and synthesis of data and information by the use of appropriate technologies  
 Adapting to new situations  
 Decision-making  
 Individual/Independent work  
 Development of free, creative and inductive thinking

### 3. MODULE CONTENT

PLI36 offers both basic and advanced knowledge of networks and services related to three main axes: The first axis focuses on the pure network part, as illustrated by the IP and TCP protocols. In this context, the offered knowledge covers Ethernet and operating structural principles, network interconnection with switches and routers, IP packet analysis, basic concepts of partitioning and addressing, IPv6 and IPsec protocols, processes and of basic routing algorithms (such as Bellman-Ford and Dijkstra), intra-sectoral (RIP and OSPF) and cross-sectoral routing (BGP). The second axis deals with network design issues starting with network types, basic architectures and corresponding design tools for loss and latency analysis, the M / M /, M / G / 1, and Erlang models, the basic graph algorithms, bridging, minimum shortest tree, shortest path, and flow capacity allocation. The third axis extends knowledge beyond IP networks to other types of networks and services, with an emphasis on photonics, wireless, mobile and satellite networks. Moreover, it covers broader issues related to the development tools for networks and telecommunications services. The above three axes are accompanied by practical training in appropriate open source tools that complement the theoretical knowledge.

Training topics are:

1. Computer Networks II (protocols, standards, Interfaces)
2. New directions of networks and services (mobile, photonic)
3. Network design issues

### 4. TEACHING METHODS--ASSESSMENT

<p><b>MODES OF DELIVERY</b> <i>Face-to-face, in-class lecturing, distance teaching and distance learning etc.</i></p>	<p>Distance education with five Group Counseling Meetings (OSS) during the academic year on weekends.</p>										
<p><b>USE OF INFORMATION AND COMMUNICATION TECHNOLOGY</b> <i>Use of ICT in teaching, Laboratory Education, Communication with students</i></p>	<p>We use : Remote meetings tools (skype for business), Presentation software (e.g. power point), Open source software tools in the subjects under training</p> <p>Additionally, the students use office automation tools, web browsers and e-reader for digital books.</p>										
<p><b>MODULE DESIGN</b> <i>Description of teaching techniques, practices and methods: Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, Internship, Art Workshop, Interactive teaching,</i></p>	<table border="1"> <thead> <tr> <th data-bbox="695 1612 1019 1650"><b>Activity</b></th> <th data-bbox="1027 1612 1351 1650"><b>Annual Workload</b></th> </tr> </thead> <tbody> <tr> <td data-bbox="695 1654 1019 1692">5 OSS (* 4 hours)</td> <td data-bbox="1027 1654 1351 1692">20</td> </tr> <tr> <td data-bbox="695 1696 1019 1797">Preparation of Assignments (5 assignments * 8 hours)</td> <td data-bbox="1027 1696 1351 1797">40</td> </tr> <tr> <td data-bbox="695 1801 1019 1839">Examination</td> <td data-bbox="1027 1801 1351 1839">4</td> </tr> <tr> <td data-bbox="695 1843 1019 1864">Individual study</td> <td data-bbox="1027 1843 1351 1864">512</td> </tr> </tbody> </table>	<b>Activity</b>	<b>Annual Workload</b>	5 OSS (* 4 hours)	20	Preparation of Assignments (5 assignments * 8 hours)	40	Examination	4	Individual study	512
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<p><i>Educational visits, projects, Essay writing, Artistic creativity, etc</i></p> <p><i>The study hours for each learning activity as well as the hours of selfdirected study are given following the principles of the ECTS.</i></p>	<p><b>Total module workload (hours)</b></p>	<p><b>576</b></p>
<p><b>STUDENT PERFORMANCE EVALUATION/ASSESSMENT METHODS</b></p> <p><i>Detailed description of the evaluation procedures.</i></p> <p><i>Language of evaluation, assessment methods, formative or summative (conclusive), multiple choice tests, short- answer questions, open-ended questions, problem solving, written work, essay/report, oral exam, presentation, laboratory work, other.....etc.</i></p> <p><i>Specifically defined evaluation criteria are stated, as well as if and where they are accessible by the students</i></p>	<p>Elaboration of written assignments during the academic year, the average of the grades of which participates in the formation of the final grade of module by 30%, if there is a passable in the final or repetitive examinations. In the final written exams the grade of the written assignments participates in the formation of the final grade of module by 70%.</p> <p>All the criteria are posted, both in each written assignment (in the LMS study.eap.gr), as well as in the general regulation of HOU at:  <a href="https://www.eap.gr/education/study-regulations/">https://www.eap.gr/education/study-regulations/</a></p>	

**(6) SUGGESTED BIBLIOGRAPHY**

<p><i>- Suggested bibliography:</i></p> <p>HOU Publications:  Volume A: Computer Networks II, EAP, Patra 2005.  Volume B: New Directions of Networks and Services, EAP, Patra 2002.  Volume C: Network Design Issues, EAP, Patra 2005.</p> <p>Additional digital material (and multimedia) is available through study platform.</p> <p><i>-Related scientific Journals:</i></p> <ol style="list-style-type: none"> <li>1) IEEE Network - The Magazine of Global Internetworking</li> <li>2) IEEE Communications Magazine</li> <li>3) IEEE Wireless Communications Magazine</li> </ol>
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