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| <b>Course unit title:</b>  | Data Communications and Computer Networks |
| <b>Course unit code:</b>   | CSC322                                    |
| <b>Type of course unit:</b><br>(Compulsory/optional)   | Compulsory                                |
| <b>Level of course unit:</b><br>(First, second or third cycle)   | Bachelor (1st cycle)                      |
| <b>Year of study:</b>  | 3   |
| <b>Semester when the unit is delivered:</b>  | 5   |
| <b>Number of ECTS credits allocated:</b>   | 6   |
| <b>Name of lecturer(s):</b>  | TBA                                       |
| <b>Learning outcomes of the course unit:</b>   |   |
| <p>Upon successful completion of this course students should be able to:</p> <ul style="list-style-type: none"> <li>• State and identify concepts relating to data communications; communication protocols and layered protocol architectures</li> <li>• State and interpret protocol communication standards like OSI/RM and TCP/IP as used in computer networking and internetworking.</li> <li>• Recognize and explain data transmission fundamentals and types of media (both wired and wireless)</li> <li>• Define and discuss data link control protocols and their functionality</li> <li>• Recall and explain multiplexing techniques and their applications</li> <li>• Define, explain and exemplify concepts related to Local Area Networks (both wired and wireless); their topologies and protocols; their types and transmission technologies</li> <li>• Describe, explain and classify types of security attacks; types and algorithms of encryption; security functionality in IP versions 4 and 6</li> </ul> |   |
| <b>Mode of delivery:</b>   | Face- to- face                            |
| <b>Prerequisites and co-requisites:</b>  | CSC214                                    |
| <b>Recommended optional program components:</b>  | None                                      |

**Course Contents:****Objective:**

To provide an overview of the broad and constantly emerging field of data communications and computer networks. Data communication is discussed as the necessary tool for understanding computer communication networks.

**Description:**

## Introduction

Communication systems, entities and components. Computer networks as communication system; their topologies and types. Communication protocols, layered communications and protocols architectures. The OSI/RM and TCP/IP standards

## Data communication systems; transmission, impairments and media

Data transmission basics; frequency concepts, bandwidth, spectrum; data rate and bandwidth. Analog and digital transmission; wired transmission impairments. Transmission media and impairments for both wired (UTP, STP, Coaxial, Fiber) and wireless (Microwave, Radio, Infrared). Signal encoding techniques; analog-to-digital (and visa-versa) data-to-signal conversion

## Communication techniques; Data Link Control; Multiplexing

Synchronous & asynchronous transmission, Error control: types, detection and correction. Flow control: Stop-and-wait, Sliding-window, Automatic Repeat Request. The High-level Data Link Control protocol: modes, frame types and operation. Frequency Division Multiplexing, Synchronous and Statistical Time Division Multiplexing, multiplexing applications (CATV, ADSL)

## Local area networks; wired and wireless

LAN topologies, protocols and the IEEE 802 standards; LAN interconnection, bridges, hubs, switches. Ethernet versions. Cellular systems: frequency reuse, capacity increase, operation. Wireless LANs: applications/types and transmission technologies

## Network security

Requirements; types of attacks; symmetric and asymmetric encryption techniques and their algorithms; Secure Socket Layer; IPv4 and IPv6 security; wireless protected access

**Recommended  
or  
required reading:**

Stallings, William, DATA AND COMPUTER COMMUNICATIONS, International edition, Prentice Hall

A. Tanenbaum, COMPUTER NETWORKS, Pearson Prentice Hall

U. Black, DATA COMMUNICATIONS AND DISTRIBUTED SYSTEMS, Pearson Prentice Hall

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|---|---|-------------------|----------|---------------------------|----------|--|------|
|   | <p>Journal: ACM Communications</p> <p>Journal: IEEE Transactions on Networking</p> <p>Halsall, F., DATA COMMUNICATIONS, COMPUTER NETWORKS AND OSI, Addison-Wesley</p> <p>William A. Shay, UNDERSTANDING DATA COMMUNICATIONS AND NETWORKS, Thomson Learning (Course)</p> <p>Michael A. Gallo, William M. Hancock, COMPUTER COMMUNICATIONS AND NETWORKING TECHNOLOGIES, Thomson Learning (Course)</p> <p>Marion Cole, INTRODUCTION TO TELECOMMUNICATIONS: VOICE, DATA AND THE INTERNET, Prentice Hall</p> <p>Wayne Tomasi, INTRODUCTION TO DATA COMMUNICATIONS AND NETWORKING, Prentice Hall</p> <p>Regis J. Bates, Donald W. Gregory, VOICE AND DATA COMMUNICATIONS HANDBOOK, McGraw-Hill</p> <p>William Stallings, BUSINESS DATA COMMUNICATIONS Prentice Hall</p> |                   |          |                           |          |  |      |
| <p><b>Planned learning activities and teaching methods:</b></p> | <table border="1" style="width: 100%;"> <tr> <td style="width: 60%;">Class Instruction</td> <td style="width: 40%; text-align: center;">42 Hours</td> </tr> <tr> <td>Consultation/Computer Lab</td> <td style="text-align: center;">30 Hours</td> </tr> </table>  | Class Instruction | 42 Hours | Consultation/Computer Lab | 30 Hours |  |      |
| Class Instruction   | 42 Hours  |                   |          |                           |          |  |      |
| Consultation/Computer Lab                                       | 30 Hours  |                   |          |                           |          |  |      |
| <p><b>Assessment methods and criteria:</b></p>                  | <table border="1" style="width: 100%;"> <tr> <td style="width: 60%;">Examinations</td> <td style="width: 40%; text-align: center;">75%</td> </tr> <tr> <td>Coursework/Assignments</td> <td style="text-align: center;">25%</td> </tr> <tr> <td></td> <td style="text-align: center;">100%</td> </tr> </table>   | Examinations      | 75%      | Coursework/Assignments    | 25%      |  | 100% |
| Examinations  | 75%   |                   |          |                           |          |  |      |
| Coursework/Assignments  | 25%   |                   |          |                           |          |  |      |
|   | 100%  |                   |          |                           |          |  |      |
| <p><b>Language of instruction:</b></p>                          | <p>English</p>  |                   |          |                           |          |  |      |
| <p><b>Work placement(s):</b></p>                                | <p>No</p>   |                   |          |                           |          |  |      |
| <p><b>Place of Teaching:</b></p>                                | <p>Regular Classroom,<br/>European University Cyprus, Nicosia</p>   |                   |          |                           |          |  |      |