



LONDON SOUTH BANK
UNIVERSITY

unit guide

Introduction to
Communications and Networks

ECI-2-830

<http://eent3.lsbu.ac.uk/staff/xiaop>

Faculty of ESBE

2006/7

become what you want to be

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1.0 UNIT DETAILS

Unit Title:	Introduction to Communications and Networks
Unit Level:	2
Unit Reference Number:	ECI-2-830
Credit Value:	1
Student Study Hours:	150
Contact Hours:	24 hours Teaching/Tutorial, 12 hours Workshop
Private Study Hours:	114
Pre-requisite Learning (If applicable):	None
Co-requisite Units (If applicable):	None
Course(s):	BEng Computer Systems and Networking BEng Internet & Multimedia Engineering BEng Telecommunications and Computer Networking Engineering
Year and Semester	Semester 1/2, 2006/7
Unit Coordinator:	Dr Perry Xiao
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Teaching Team & Contact Details (If applicable):	Dr Vincent Siyau, Room T710, Tel: 020 7815 7507, Email: siyaum@lsbu.ac.uk Dr Alejandra Flores Mosri, Room T711, Tel: 020 7815 7123, Email: floresaa@lsbu.ac.uk
Subject Area:	Telecommunications and Internet Engineering
Summary of Assessment Method:	Exam + Course Work

2.0 SHORT DESCRIPTION

This unit is intended to give students an introduction on data communications and computer networking.

3.0 AIMS OF THE UNIT

The aims of the unit are:

1. understand the role of communications in industry and commerce
2. employ general principles of engineering design and practice
3. understand modulation techniques for signal transmission
4. apply knowledge of network topologies to evaluate their effectiveness in specific application
5. be familiar with protocols for network communications

4.0 LEARNING OUTCOMES

4.1 INTELLECTUAL SKILLS

- understand basic principles of communication systems
- be familiar with basic components of communication systems
- understand basic principles of computer networks
- be familiar with basic computer network devices

4.2 PRACTICAL SKILLS

- Problem solving using Matlab
- Computer networking using serial port, parallel port and USB port.

4.3 TRANSFERABLE SKILLS

- Basic Knowledge of communications systems
- Understanding of the computer networking technologies.
- Using the habit of using a logbook to organise time and work
- Have experience in finding out straightforward information from books and other sources, possess it, and so increase their learning confidence
- Abilities of solving complex problems using engineering approach
- Organization and self management skills

5.0 INTRODUCTION TO STUDYING THE UNIT

5.1 OVERVIEW OF THE MAIN CONTENT

Week 1: Introduction to Communication Systems

Learning Outcomes:

On completion of this section you will

- know the basic components of a communication system
- recognise the functions to be implemented
- know the properties of key components

Lecture Topics:

- public network, the web and the internet
- signaling on a voice network and call routing
- communication systems and exchanges
- various communication systems

Week 2: Introduction to Network Systems

Learning Outcomes:

On completion of this section you will have the ability to

- understand the basics of the computer network
- understand the structure and its layer functions of OSI 7-layer model and TCP/IP model

Lecture Topics:

- Computer network concepts, topology
- Functions and roles of OSI 7-layer model and TCP/IP model

Week 3: Basics of Data Communication

Learning Outcomes:

On completion of this section you will

- understand the need for a diversified range of data communication systems
- be able to distinguish between data communication and telecommunication

Lecture Topics:

- various codes
- terminal implementation
- serial, parallel, synchronous, asynchronous, duplex, half-duplex, simplex transmissions

Week 4: IP

Learning Outcomes:

On completion of this section you will have the ability to

- Recognize the need for IP address and IP
- Understand the principles of subnetting, superneting and CIDR
- Identify the roles of each field in IPv4 header and IPv6 header

Lecture Topics:

- IPv4/IPv6 addresses
- Subnetting, Superneting, and CIDR
- IPv4 and IPv6 functions and roles

Week 5: Standards and Standardization Organizations

Learning Outcomes:

On completion of this section you will have the knowledge of

- standards organizations for telecommunication industry
- standards for interfaces, transmission and transmission media

Lecture Topics:

- ISO, ITU, ANSI, IEEE, IETF, RFCs
- The RS-232-C standard
- The RS-449, RS-422-A and RS-423-A standards

Week 6: Local Area Networks (LAN)

Learning Outcomes:

On completion of this section you will have the ability to

- Identify the advantages and limitations of network topologies.
- Identify the advantages and limitations of network control techniques
- Understand the requirements and functions of the LAN networking interfaces and devices.

Lecture Topics:

- Star, token ring, bus structure, hub-tree
- Communication and error control
- Data structures, frames
- Standards and protocols
- LAN networking interfaces and devices (repeater, bridge, hub, switch etc)

Week 7: Modulation

Learning Outcomes:

On completion of this section you will have the ability

- recognize the advantages and limitations of modulation systems

- apply the mathematical principles to predict signal characteristics
- sketch simple modulated waveforms
- determine signal bandwidth

Lecture Topics:

- Amplitude modulation.
- Frequency modulation.

Week 8: Wide Area Networks (WAN)

Learning Outcomes:

On completion of this section you will have the ability to

- understand the operation of common WAN systems
- Identify an appropriate technique for given applications with reference to complexity, cost and efficiency
- Recognize the roles of routers and gateways

Lecture Topics:

- Circuit switched networks
- Packet switched networks
- Leased line, routers and gateway

Week 9: Multiplexing

Learning Outcomes:

On completion of this section you will have the ability to

- Understand the requirement of multiplexing
- Identify an appropriate technique for given applications with reference to complexity, cost and efficiency

Lecture Topics:

- Frequency division multiplexing
- Time division multiplexing.

Week 10: Error Detection and Correction

Learning Outcomes:

On completion of this section you will have the ability to

- Select the appropriate error detection technique
- Understand the operation of error correction codes

Lecture Topics:

- Parity bit codes
- Block sum check
- Cyclic redundancy check
- Hamming code
- Error control strategies

Week 11: Digital Modulation

Learning Outcomes:

On completion of this section you will have the ability to

- understand the requirement of digital modulation.

Lecture Topics:

- ASK, PSK, FSK.

Week 12: Coding for Digital Communications

Learning Outcomes:

On completion of this section you will have the ability to

- Know the techniques used and their characteristics
- Select the appropriate coding system for given applications

Lecture Topics:

- Return to zero, non-return to zero, bipolar, Manchester

5.2 OVERVIEW OF TYPES OF CLASSES

By lectures, tutorials exercises and laboratory sessions.

5.3 IMPORTANCE OF STUDENT SELF-MANAGED LEARNING TIME

In this unit, you are required to carry out 114 hours of self study, which is essential to master the teaching content.

6.0 THE PROGRAMME OF TEACHING, LEARNING AND ASSESSMENT

Teaching is by 24 hours lectures/tutorials, and 12 hours of laboratory work. Lectures will cover all the main aspects of the subject matter in the unit. Printed material, which will include some lecture material and tutorial examples will be provided. The laboratory exercises are designed to supplement the lectures. Lectures and laboratory experiments are treated as a unified body of work.

7.0 ASSESSMENT OF THE UNIT

There will be one 2-hour written examination (60%) and lab work (40%). Each student is expected to maintain a logbook on all the lab works. The logbooks will be examined periodically during the lab sessions. Each student will be required to produce a formal written report based on the lab work. You will be required to submit your logbook and 2 reports (to be specified in the early part of the semester) by the submission dates, which will be notified during the semester allowing you sufficient time to complete your work. You MUST submit your reports, following the standard faculty procedure, to J200 between 10:00 and 16:00. Late submission will be penalized in accordance with the University regulation.

8.0 LEARNING RESOURCES

8.1 CORE MATERIALS

- Beyda W, Basic Data Communications, 2nd Ed, Prentic-Hall, 1995
- Forouzan B A, Data Communications and Networking, 2nd Ed, McGraw-Hill, 2000

8.2 OPTIONAL MATERIALS

- Douglas Comer, David L Stevens, Internetworking with TCP/IP, 3rd Ed, Prentice Hall, 1998
- Dunlop J Smith D G, Telecommunications Engineering, 3rd Ed., Chapman & Hall, 1994
- Schweber W, Electronic Communication Systems, 4th Ed., Prentice Hall, 2002
- D L Shinder, Computer Networking Essentials, Cisco Press, 2001
- Zheng Y Akhtar S, Networks for Computer Scientists and Engineers, Oxford University Press, 2002
- Mikalson A, Borgesen P, Local Area Network Management, Design and Security

NOTES

You may notice that this guide states that the unit requires 150 study hours, whereas previous guides have defined each unit as 120 study hours. The University has made this change in line with the way study time is likely to be expressed, in future, in the majority of Universities. There is no change in teaching time, and no change in what you are expected to do or achieve. The change concerns the way study time is measured. Previously, the unit was defined as 120 hours work over 12 teaching weeks. The new measure is still 10 hours per week over 15 weeks, including assessment.

The workload for a full time student is still expected to be approximately 40 hours per week.