

# Module Information

Module Identifier	<b>CS15210</b>
Module Title	<b>An Introduction to Communications and Telematics</b>
Academic Year	<b>2014/2015</b>
Co-ordinator	<b><u>Mr David Ernest Price (mailto:dap@aber.ac.uk?subject=CS15210)</u></b>
Semester	<b>Semester 2</b>
Co-Requisite	<b><u>CS10110 (?m=CS10110)</u></b>
Other Staff	<b><u>Mr David Ernest Price (mailto:dap@aber.ac.uk?subject=CS15210)</u></b> <b><u>Mr Michael Francis Clarke (mailto:mfc1@aber.ac.uk?subject=CS15210)</u></b>

## Course Delivery

Delivery Type	Delivery length / details
Lecture	22 lectures
Practical	4 x 2hrs

## Assessment

Assessment Type	Assessment length / details	Proportion
Semester Exam	1.5 Hours online examination	100%
Supplementary Exam	1.5 Hours online examination	100%

## Learning Outcomes

On successful completion of this module, students will be able to demonstrate knowledge and understanding of the following topics:

- analogue and digital signals and data;
- modems and modulation;
- the characteristics of the principal transmission media;
- the role and functions of the principal components of LANs and WANs;
- the role of protocols and the characteristics of some widely used ones;
- factors affecting the capacity of a communications channel;
- the role of standards and regulation in the telecommunications field and the processes that support this role;
- the history and evolution of modern computer-based communication systems.

In addition, students will be able to carry out straightforward numerical calculations relating to network and channel capacity.

## Brief description

Computers and telecommunications have become intimately related in a world in which the Internet and the World Wide Web loom so large. Every graduate in a computing-related discipline needs to have a basic knowledge and understanding of telecommunications. The purpose of this module is to instil this basic knowledge and understanding, which, for most but not all students, will lead on to deeper study of some aspects of communications at level 2 or level 3.

## Content

### 1. Basics of Data Communication

Waves: amplitude, frequency, and phase. Measurement of frequency. Why waves are important.

Analogue and digital data and signals. The PSTN as an analogue network. The concept of bandwidth. Binary data; bits and bytes; ASCII; the use of lateral and longitudinal parity for error correction and detection. The use of the PSTN for transmission of digital data: modems and modulation (amplitude, frequency and phase).

Transmission modes: simplex, half-duplex and duplex transmission; synchronous and asynchronous transmission; parallel and serial transmission.

Transmission media: twisted pairs, co-ax, fibre optics, microwave, radio, satellite transmission. Speed, distance, cost and error rates of various transmission media.

Function and role of the major components of a network: multiplexors, concentrators, repeaters, routers and bridges.

Channel capacity. Nyquist's Theorem and the Shannon-Hartley Theorem. Application to the PSTN and to modem design.

### 2. Computer Networks

Networks and what they are used for. Nodes, switches, servers and hosts. Local area networks and wide area networks. Circuit switching and packet switching.

Standards and protocols. The standards-making process and the standards-making bodies; de facto and de jure standards. The OSI seven layer model.

### 3. The Internet

Brief history of the Internet and its evolution. Internet standards, control and regulation. Protocols used on the Internet: IP, TCP, UDP, FTP, Telnet.

### 4. Wide Area Networks

Public Switched Networks and private lines: Kilostream, Megastream, and similar services;N- ISDN. Examples of WANs.

### 5. Local Area Networks

LAN topologies and their characteristics. Cost of attaching devices to networks; Media access and sharing strategies. Ethernet, token rings, slotted rings. Fundamental performance characteristics of the different architectures.

### 6. Telematic Applications

A survey of current applications of telematics, covering both their commercial characteristics and their technical requirements.

### 7. History and Regulation

A brief history of the development of both the technology and the regulation of communication systems. Common Carriers; UK carriers: British Telecom, Kingston and the new market entrants.

## Reading List

### Recommended Text

Forouzan, Behrouz A. (2012) *Data Communications and Networking, Global Edition* [http://highered.mcgraw-hill.com/sites/0071315861/information\\_center\\_view0/](http://highered.mcgraw-hill.com/sites/0071315861/information_center_view0/) ([http://highered.mcgraw-hill.com/sites/0071315861/information\\_center\\_view0/](http://highered.mcgraw-hill.com/sites/0071315861/information_center_view0/)) 5th Ed. McGraw-Hill

Forouzan, Behrouz A. (2006.) *Data communications and networking /Behrouz A. Forouzan with Sophia Chung Fegan.* 4th ed. McGraw-Hill [Primo search](#)

([http://primo.aber.ac.uk/primo\\_library/libweb/action](http://primo.aber.ac.uk/primo_library/libweb/action)

[/search.do?v1%28freeText0%29=Data+communications+and+networking+%2FBehrouz+A.+Forouzan+with+Sophia+Chung+Fegan.+Forouzan%2C+Behrouz+A.&fn=search&vid=ABERU\\_VU1](/search.do?v1%28freeText0%29=Data+communications+and+networking+%2FBehrouz+A.+Forouzan+with+Sophia+Chung+Fegan.+Forouzan%2C+Behrouz+A.&fn=search&vid=ABERU_VU1))

Forouzan, Behrouz A. (2007.) *Data communications and networking.* International ed., 4th ed. McGraw-Hill Higher Education [Primo search](#)

([http://primo.aber.ac.uk/primo\\_library/libweb/action/search.do?v1%28freeText0%29=Data+communications+and+networking.+Forouzan%2C+Behrouz+A.&fn=search&vid=ABERU\\_VU1](http://primo.aber.ac.uk/primo_library/libweb/action/search.do?v1%28freeText0%29=Data+communications+and+networking.+Forouzan%2C+Behrouz+A.&fn=search&vid=ABERU_VU1))

Forouzan, Behrouz A. (2007.) *Data communications and networking.* 4th ed. McGraw-Hill Higher Education [Primo search](#) ([http://primo.aber.ac.uk/primo\\_library/libweb/action/search.do?v1%28freeText0%29=Data+communications+and+networking.+Forouzan%2C+Behrouz+A.&fn=search&vid=ABERU\\_VU1](http://primo.aber.ac.uk/primo_library/libweb/action/search.do?v1%28freeText0%29=Data+communications+and+networking.+Forouzan%2C+Behrouz+A.&fn=search&vid=ABERU_VU1))

## Notes

This module is at [CQFW](http://wales.gov.uk/topics/educationandskills/qualificationsinwales/creditqualificationsframework/?lang=en) (<http://wales.gov.uk/topics/educationandskills/qualificationsinwales/creditqualificationsframework/?lang=en>) Level 4