**Liverpool** John Moores University

Title:                               COMPUTER NETWORKS
Status:                             Definitive
Code:                               **7076COMP**    (120332)
Version Start Date:           01-08-2015

Owning School/Faculty:       Computing and Mathematical Sciences
Teaching School/Faculty:     Computing and Mathematical Sciences

| Team | Leader |
|------|--------|
| Hui Cheng | Y |
| Faycal Bouhafs | |

| **Academic Level:** | FHEQ7 | **Credit Value:** | 20.00 | **Total Delivered Hours:** | 36.00 |
|---|---|---|---|---|---|
| **Total Learning Hours:** | 200 | **Private Study:** | 164 | | |

**Delivery Options**
Course typically offered: Semester 2

| Component | Contact Hours |
|-----------|---------------|
| Lecture | 12.000 |
| Practical | 12.000 |
| Tutorial | 12.000 |

**Grading Basis:** 40 %

**Assessment Details**

| Category | Short Description | Description | Weighting (%) | Exam Duration |
|----------|-------------------|-------------|---------------|---------------|
| Report | AS1 | Research involving analysis of a contemporary computer networking challenge. | 60.0 | |
| Report | AS2 | Design and practical investigation of a data networking protocol based on an application scenario. | 40.0 | |

**Aims**

*To develop the student's understanding of Open Networking Systems (ONS)*

*To develop the student's understanding of Internet architecture, as a major ONS*
*To develop the student's understanding of Telecommunications role in ONS*
*To gain practical experience of communications protocols and architectures.*

## Learning Outcomes

After completing the module the student should be able to:

1       Critically evaluate computer networks, their architectures, protocols and services.
2       Demonstrate advanced knowledge of the structure and requirements of local and wide area networks.
3       Demonstrate expertise in the problems associated with the construction and management of Open Networking Systems, and their domains of application.
4       Apply advanced knowledge of the up-to-date techniques, methods, and architectures to specify, design, and implement data networking solutions.

## Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

| | | |
|---|---|---|
| Computer Networks Analysis | 1 | 2 |
| Design Investigation | 3 | 4 |

## Outline Syllabus

*Introductory material – the networking problem, applications of networks, protocols and protocol layering, network architecture, open and closed systems, private and public networks, circuit and packet switching.*

*Data Communications – physical and data link layers protocols and functionality, Local Area Networking, Medium Access Control (MAC), LAN standards including Ethernet.*

*Internet – Internet architecture, TCP/IP, IPv6, Routing, Internet application layers, DNS, comparison with OSI Model.*

*Wide Area Network and Access Networks – broadband Internet (CATV, ADSL), telecommunications, enterprise network standards (ATM, Frame Relay, new Ethernet).*

*Multimedia Networking – multimedia performance requirements (bandwidth, delay, jitter), ATM, QoS (DiffServ, IntServ, MPLS), comparison with 'Best-Effort' approach*
*Network Management – FCAPS model of network management, focus on Network Security to illustrate management; defining network security, secure communications via IPSec encryption, firewalls, intrusion detection, other network access controls (biometrics, smart cards).*

**Learning Activities**

Tutorial and Labs will support the lectures.

**Notes**

This module covers recent developments in the area of computer networks and distributed applications. Technologies covered include Ethernet, TCP/IP, IPv6, ATM, MPLS, ADSL as well as studying the requirements of multimedia service networks, the Internet vs Telecommunications, and network management. These technologies are put within the context of modern network environments such including enterprise networking, home broadband as well as applications such as VoIP. Students are given the opportunity to study practical aspects of network design through the lab session.