# H6DCN: Data Communications and Networking

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| **Module Code:** | H6DCN |
| **Long Title** | Data Communications and Networking APPROVED |
| **Title** | Data Communications and Networking |
| **Module Level:** | LEVEL 6 |
| **EQF Level:** | 5 |
| **EHEA Level:** | Short Cycle |
| **Credits:** | 5 |
| **Module Coordinator:** | PAUL HAYES |
| **Module Author:** | David McCarthy |
| **Departments:** | School of Computing |
| **Specifications of the qualifications and experience required of staff** | Lecturer preferably with Master's degree or PHD in a computing or cognate discipline. May have industry experience also.<br><br>Proposed Lecturer: Dr. Paul Hayes. Dr. Sachin Sharma |

| Learning Outcomes | |
|---|---|
| *On successful completion of this module the learner will be able to:* | |

| # | Learning Outcome Description |
|---|---|
| LO1 | Explain the theory, concepts and principles of data communications |
| LO2 | Define terms used in data communications and networking |
| LO3 | Identify and describe the types and uses of networks and data communications technology issues |
| LO4 | Transfer and apply theoretical concepts to problem solving in a range of data communications and networking contexts in the 'real world' |
| LO5 | Illustrate the functions of the TCP/IP layers and their application to the Internet |
| LO6 | Identify current and future data communications and networking trends |

| Dependencies |
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| *Module Recommendations* |
| No recommendations listed |
| *Co-requisite Modules* |
| No Co-requisite modules listed |

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| *Entry requirements* | See section 4.2 Entry procedures and criteria for the programme including procedures recognition of prior learning. |

# H6DCN: Data Communications and Networking

## Module Content & Assessment

### Indicative Content

**Introduction to Data Communication**
• Data Communication. • Data versus Information. • Centralised and Distributed Processing. • Client-Server and Cloud Computing. • Categories of networks. • The Internet Protocols and standards • Emergent technologies

**Network Models**
• Layered architecture. • Encapsulation Peer-to-peer processes. • The OSI model. • Layers in the OSI model • TCP/IP protocol suite • TCP/IP versions

**Digital and Analog Transmission**
• Analog and digital signals. • Bandwidth Transmission Impairment. • Analog-to-digital conversion. • Transmission Mode

**Multiplexing and Switching**
• Wavelength-division multiplexing. • Circuit switching. • Packet switching. • Datagram approach • Virtual circuit approach

**Transmission Media**
• Characteristics of Guided Media • Twisted-Pair cable • Co-axial Cable • Fibre-optic cable •(Vertical and Horizontal) Integrity Enhancement Features Characteristics of Unguided Media • Radio waves, Microwaves, Infrared

**Local Area Networks**
• Multiple Access Protocols. • Traditional Ethernet CSMA/CD. • Switched Ethernet. • Fast Ethernet • Gigabit Ethernet • Wireless LAN • CSMA/CA

**Connecting LANs and Backbone Networks**
• Repeater • Hub • Switch • Router • Backbone Networks • Virtual LANs

**TCP/IP Network Layer Part 1**
• IP Addressing • Subnetworking • Internetworking • IP Versions • Transition from IPv4 to IPv6

**TCP/IP Network Layer Part 2**
• Address Mapping • ARP, RARP and BOOTP • DHCP • ICMP and IGMP

**Transport Layer**
• Introduction to Transport Layer • Process-to-Process Communications • Transport Layer Ports • Connectionless versus Connection-Oriented • Introduction to Transport Layer Protocols (e.g. TCP, UDP etc.

**Application Layer**
• Introduction to Application Layer • Application Layer Protocols (e.g. DNS, HTTP, FTP etc.

| Assessment Breakdown | % |
| --- | --- |
| Coursework | 40.00% |
| End of Module Assessment | 60.00% |

**Assessments**

## Full Time

### Coursework

| | | | |
| --- | --- | --- | --- |
| **Assessment Type:** | Formative Assessment | **% of total:** | Non-Marked |
| **Assessment Date:** | n/a | **Outcome addressed:** | 1,2,3,4,5,6 |
| **Non-Marked:** | Yes | | |

**Assessment Description:**
Ongoing independent and group class activities and feedback.

| | | | |
| --- | --- | --- | --- |
| **Assessment Type:** | CA 1 (0380) | **% of total:** | 40 |
| **Assessment Date:** | n/a | **Outcome addressed:** | 1,2,3,4,5,6 |
| **Non-Marked:** | No | | |

**Assessment Description:**
Students may be assessed through continuous assessments, including at least 2 summative tests, that fosus on student understanding of the course material.

### End of Module Assessment

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| --- | --- | --- | --- |
| **Assessment Type:** | Terminal Exam | **% of total:** | 60 |
| **Assessment Date:** | End-of-Semester | **Outcome addressed:** | 1,2,3,4,5,6 |
| **Non-Marked:** | No | | |

**Assessment Description:**
Written proctored end of semester examination to access all the learning outcomes.

No Workplace Assessment

### Reassessment Requirement

**Repeat examination**
*Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element.*

**Reassessment Description**
Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element. Learners who fail this module will be required to sit a repeat module assessment where all learning outcomes will be examined.

## H6DCN: Data Communications and Networking

| Module Workload | | | | |
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| Module Target Workload Hours 0 Hours | | | | |
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| Workload: Full Time | | | | |
|---|---|---|---|---|
| *Workload Type* | *Workload Description* | *Hours* | *Frequency* | *Average Weekly Learner Workload* |
| Lecture | No Description | 24 | Per Semester | 2.00 |
| Tutorial | No Description | 12 | Per Semester | 1.00 |
| Independent Learning | No Description | 89 | Per Semester | 7.42 |
| | | | Total Weekly Contact Hours | 3.00 |

| Workload: Part Time | | | | |
|---|---|---|---|---|
| *Workload Type* | *Workload Description* | *Hours* | *Frequency* | *Average Weekly Learner Workload* |
| Lecture | No Description | 24 | Per Semester | 2.00 |
| Tutorial | No Description | 12 | Every Week | 12.00 |
| Independent Learning | No Description | 89 | Per Semester | 7.42 |
| | | | Total Weekly Contact Hours | 14.00 |

## Module Resources

### Recommended Book Resources

Julia Panko and Raymond R. Panko. (2015), Business Data Networks and Security, 10th Edition. Pearson Education, [ISBN: 1292075414].

Andrew S Tanenbaum and David J. Wetherall. (2013), Computer Networks, 5th Edition. Pearson Education, [ISBN: 1292024224].

James F. Kurose and Keith W. Ross. (2012), Computer Networking: A Top-Down Approach, 6th Edition. Pearson Education, p.864, [ISBN: 0273768964].

Behrouz Forouzan. (2013), Data Communications and Networking, 5th Edition. McGraw-Hill Science/Engineering/Math, p.1264, [ISBN: 0073376221].

### Supplementary Book Resources

William Stallings. (2013), Data and Computer Communications, 10th Edition. Pearson Education, [ISBN: 1292014385].

*This module does not have any article/paper resources*

*This module does not have any other resources*

**Discussion Note:**