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| **MODULE TITLE:** | **Networking** |
| **MODULE CODE:** |  |
| **LEVEL:** | 5 |
| **CREDITS:** | 20 |
| **PART ONE** |  |
|  |  |
| **TOTAL STUDY HOURS:** | 200 |
| **STUDY HOURS BREAKDOWN** | 24 hours lectures and workshops  8 hours individual and group tutorials  168 hours independent learning |
| **PRE-REQUISITES:** |  |
| **EXCLUDED COMBINATIONS:** |  |
| **MODULE LEADER:** | Chris Janes |
| **MODULE CONTRIBUTOR(S):** |  |

**RATIONALE**

The module introduces students to the core concepts and technologies underlying network communications between computers. Students will study the concept of the network stack and implement low level networking code to develop an understanding of the processes involved.

The module will build from the basics up to real time communication of data between two or more networked computers, providing students with insights into the various factors that must be considered when developing network enabled applications.

**AIMS**

1. Introduce students to the underlying theories and concepts behind computer network communication.
2. To develop an ability to implement network enabled applications.

**LEARNING OUTCOMES**

1. Demonstrate an understanding of modern computer networks.
2. The core concepts of network architecture and communication protocols
3. Implementation of a computer application that enables communication between multiple computers.

**INDICATIVE CONTENT**

Transport protocols; TCP and UDP, network layers, sockets, multiplayer, communication protocols, peer-to-peer, data packets, packet loss, latency, latency compensation, unicast, multicast and broadcast, client and server communication.

**LEARNING AND TEACHING STRATEGIES**

The module will be taught in a series of lectures and workshop sessions, using a combination of presentations/demonstrations, online materials and small group or individual discussion. Key concepts will be presented to the group and illustrated through multimedia demonstrations. Learning of specific techniques will be reinforced through formatively assessed tasks.

**EMPLOYABILITY SKILLS**

On successful completion of this module, a student will be able to demonstrate achievement of the following Employability Skills:

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| Communication | C1 | Reading, selecting, analyzing and synthesizing information from a range of sources. |
|  | C2 | Producing different kinds of documents. |
| Numeracy | N2 | Working with data |
|  | N3 | Presentation of your findings |
| Technology | T1 | Preparing information. |
|  | T2 | Processing and presenting information. |
|  | T3 | Reviewing the use of Information Technology. |
| Problem Solving | PS1 | Develop a strategy for using skills in problem-solving, for a short term routine problem or a longer term extended problem. |

**ASSESSMENT**

Summative assessment is undertaken through the use of two assessments; the first requiring students to design a basic communication protocol for sending information between two or more computers on a network and the second implementing that protocol within a computer application.

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| **Component Number** | **Form of assessment** | **Assessment size** | **Weighting (%)** | **Learning Outcomes assessed** |
| 1 | Communication protocol design | 1000 words | 30% | 1, 2 |
| 2 | Network application development | 2000 words | 70% | 2, 3 |

**ASSESSMENT CRITERIA**

1. Analyzed network theories and concepts as part of a protocol design.
2. Produced a communication protocol design that allows for the bare minimum of requirements to enable communication between two networked devices.
3. Submitted a computer application that allows communication between two connected devices, based upon a custom communication protocol.

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| **MODULE CODE:** |  |
| **LEVEL:** | **5** |
| **CREDITS:** | **20** |
| **PART TWO** | | | |

**INDICATIVE READING**

**Essential Reading**

A. S. Tanenbaum, Computer Networks, Pearson, 2011

**Recommended Reading**

James Kurose, Keith Ross, Computer Networking: A Top-Down Approach, Pearson, 2012

Jouni Smed, 2006. Algorithms and Networking for Computer Games. 1 Edition. Wiley.

Grenville Armitage, 2006. Networking and Online Games: Understanding and Engineering Multiplayer Internet Games. 1 Edition. Wiley.

Game Networking | gafferongames.com. 2014. Game Networking | gafferongames.com. [ONLINE] Available at:<http://gafferongames.com/networking-for-game-programmers/>. [Accessed 04 December 2014].

**EQUIPMENT LIST**

Students will need access to the games computers and specialised software located in R105 and R106.