Current Record

Module Details

Module Code CS2031

Module Name TELECOMMUNICATIONS II

Module Short Title

ECTS weighting 5

Semester/term taught MichaelmasTerm

Contact Hours

Lecture hours: 22

Lab hours: 22

Tutorial hours: 11

Total hours: 55

Module Personnel Lecturer - Assistant Professor Stefan Weber

Learning Outcomes When students have successfully completed this module they should be able to

- explain the key concepts of networking technologies.
- describe different mechanisms for error detection and correction.
- illustrate the communication between networked applications.
- analyse communication problems between devices connected by various media.

Module Learning Aims The module is structured following the Open Systems Interconnect (OSI) model and consists of two parts.

The first part of the module focuses on the concepts and mechanisms that are employed in the 2nd layer of the OSI model, the data link layer. This layer is concerned with the delivery of data between two immediately connected devices i.e. devices that share a common physical medium. The layer coordinates the access to the physical medium and attempts to detect and correct errors introduced by

the transfer of signals over the physical medium. The concepts that are employed in this layer are discussed and the students exercises that demonstrate the application of these concepts.

The second part of the module focuses on the 3rd and 4th layer of the OSI model. The 3rd layer, the network layer, focuses on the connection of local area networks (LANs). This layer employs concepts that hide the communication through a LANs and provide an abstraction that allows the communication across various interconnected LANs. This abstraction forms the foundation for today's internet and represents essential knowledge for today's computer science graduates. The 4th layer, the transport layer, provides services such as reliable transport to applications. The understanding of the mechanisms employed in this layer is essential to the understanding of the implementations and performance of current network technology.

Module Content

1. Data Communications Interface

- Introduction into Link Layer Issues
- Asynchronous and Synchronous Transmission

- Line Configurations – Simplex, Duplex, Point-to-Point and Multipoint Links

2. Error Detection and Correction

- Types of Errors – Single-bit Errors, Burst Errors
- Parity, Block Sum Check/LRC
- Cyclic Redundancy Check (CRC)
- Hamming Code

3. Data Compression

- Relative Encoding, Character Suppression
- Huffman Encoding

4. Error and Flow Control

- Idle RQ, Continuous RQ, Selective Repeat, Go-Back-N

- X-ON/X-OFF, Sliding Window Protocol

5. Data Link Protocol

- Bit Oriented Protocols – PPP

- High-level Data Link Control (HDLC)

6. Local Area Networks (10 Mbps)

- Network Topologies
- IEEE 802.3 Ethernet Networks
- IEEE 802.5 Token Ring Networks
- Layer-2 Switching

7. Introduction to TCP/IP

- Circuit and Packet Switching
- TCP/IP Reference Model
- Internet Protocol and Addressing
- Address Resolution Protocol (ARP)

- UDP and TCP
- Internet Applications – HTTP Case Study (Top Down Approach)

8. Routing Protocols

- Link State and Distance Vector Routing Protocols

Recommended Reading List

- Data Communications and Networking, 4th edition, Behrouz Forouzan
- Computer Networks, 5th edition, Andrew Tanenbaum

Module Pre Requisite CS1025 and CS1031

Module Co Requisite

Assessment Details Assessment is by written examination (contributing 80% to the overall mark) and continuous assessment (contributing 20% to the overall mark). To pass the module, students must achieve an overall mark of 40%.

In the supplemental examinations, assessment is by written examination only, which contributes 100% of the overall mark.

Module Website	Website: http://webct.tcd.ie/webct/logon/23490206001
Module approval date	
Approved By	
Academic Start Year	
Academic Year of Data	2013/14