Module Code | CS2031  
Module Title | Telecommunications II  
Pre-requisites | CS1025 and CS1031  
ECTS | 5  
Chief Examiner | Dr Stefan Weber  
Teaching Staff | Dr Stefan Weber  
| Delivery | Lecture hours | Lab hours (per student) | Tutorial hours (per student) | Total  
| | 22 | 22 | 11 | 55  
Module 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 Layer 2 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 are given exercises that demonstrate the application of these concepts.  
The second part of the course focuses on Layer 3 of the OSI model. Layer 3, the Network layer, focuses on the interconnection of individual local networks. This layer employs concepts that hide the communication through a LANs and provide an abstraction that allows the communication across various interconnected LANs. The understanding of the mechanisms employed in this layer is essential to the understanding of the implementations and performance of current network technology.  
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.  
Syllabus | Specific topics addressed in this module include:  
1. Introduction  
• Internet Applications – HTTP Case Study (Top Down Approach)  
• Open Systems Interconnect (OSI) model  
2. Data Communications Interface  
• Introduction into Link Layer Issues  
• Asynchronous and Synchronous Transmission  
• Line Configurations – Simplex, Duplex, Point-to-Point and Multipoint Links
3. Error Detection and Correction
   - Types of Errors – Single-bit Errors, Burst Errors
   - Parity, Block Sum Check/LRC
   - Cyclic Redundancy Check (CRC)
   - Hamming Code

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 IP
   - Internet Protocol and Addressing
   - Address Resolution Protocol (ARP)
   - UDP / Multicast

8. Routing Protocols
   - Circuit and Packet Switching
   - Link State and Distance Vector Routing Protocols

**Assessment**
The course work accounts for 20% of the final mark of the module and the written examination for the remaining 80%.

*Assessment in the supplementals is by 100% written examination only.*

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

**Website**
- MyTCD/Blackboard