**Module Title: Data Communications and Networking**

Module Code: CMM1312

Module Value: 1.0

Duration: 30 weeks

Class-Contact Hours: Lecture 30 hours.

Tutorial 15 hours.

Laboratory 15 hours.

Assessment Scheme: Continuous Assessment 30%

Examination 70%

**Module Rationale/Aims:**

· to introduce a foundation knowledge of Data Communications terminology and concepts;

· to provide an introduction to data communication interface standards and devices;

· to outline the 7-layer RM/OSI reference model for network systems;

· to introduce the basic concept of internetworking;

· to enable students to have a foundation knowledge of Internet Technology.

**Learning Objectives:**

Students will be able to:

· demonstrate the knowledge of data communication through practical exercises;

· specify important protocols and standards in the context of RM/OSI;

· demonstrate the skills necessary for network systems;

· apply the knowledge of the Internet Technology in using Internet applications.

**Syllabus Keywords:**

ASCII, EBCDIC, parity check, asynchronous, synchronous, bit and byte synchronization, multiplexers, error control, flow control, interface standards, LAN, MAN, WAN, RM/OSI, bridge, router, gateway, TCP, IP, internet addressing, Web server, Security.

**Recommended Textbooks/ References:**

Shelly Cashman, "Business Data Communication", Inter'l Thomson 2 nd edition, 1998 David A. Stamper, "Business Data Communications", Addison Wesley 5 th edition,1999 William Stallings, "Business Data Communication", Prentice Hall International 2 nd edition, 1994 Andrew S. Tanenbaum, "Computer Networks", Prentice Hall International 3 rd edition, 1996 James Martin, "Local Area Networks", Prentice Hall International 2 nd edition, 1994Key Content Area:

**Content Lecture Tut/Lab**

**1 Fundamentals of Data Communications**

a Overview of Data Communication Systems

b Analog and digital signals

c Transmission codes e.g. ASCII and EBCDIC

d Communication modes : simplex, half duplex and full-duplex

e Transmission media (Conducted and Radiated) and their characteristics

f Description of modulation and demodulation, modulation techniques

g Noises and errors

h Error detection techniques e.g. Parity, block sum check (Horizontal/Vertical) and CRC

**2 Techniques of transmission**

a Types of Data Communication lines e.g. point to point, multidrop, switched networks and high-speed network

b Serial and parallel transmission

c Asynchronous transmission: Bit synchronization, Character synchronization and Frame synchronization

d Synchronous transmission: clock encoding and extraction

e BISYNC, SDLC, HDLC

f Efficiency of Transmission

**3 Transmission devices**

a Multiplexers (Frequency division/Time Division),Concentrators, Statistical Multiplexers and Front-End processors.

**4 Interface standards and Devices**

a UART and USRT

b Interface Standards e.g. V.24 and V.90

c Modem AT command set

d Error control and data compression

**5 Basic Networking Concepts**

a Computer Networks e.g. LAN, MAN and WAN

b Standard Organizations e.g. ISO, IEEE, ITU

c RM/OSI Network Layering ModelKey Content Area: Indicative Time/hours

**6 Introduction to Local Area Networks**

a LAN concepts

b Networking topologies: Star, Bus, Ring

c Peer-to-peer networks and client-server networks

d LAN Protocols e.g. Ethernet and Token Ring

e LAN directory services, login, security and workstation tools

f Internetworking devices e.g. Bridge, Router and Gateway

g Industrial Network Operating Systems

**7 Introduction to Internet technology**

a Internet and Intranet technology

b TCP/IP protocol suite

c Web server and Security