Course Title: Computer Networks

Course Code: EE3015

Units: 3

Level: B3

Course Aims and Objectives:
The aim of this course is to introduce the concepts, techniques, and structures of data communication networks; emphasis will be placed on the Internet. The objectives of this course include the introduction of necessary knowledge in different components in data communication networks; their structures, techniques as well as some common standards. In addition, the Internet is studied as an example network in the course.

Intended Learning Outcomes:
On completion of this course, the students will be able to

1. Recognise the major components of a computer network
2. Explain the working principles of the five layers in TCP/IP protocol suite
3. Recognise the various techniques used in LANs
4. Apply the knowledge gained to set up and configure a small computer network

Syllabus:

Components of a small computer network
Stations and their operating systems; Servers and network operating systems; Network applications: file services, print service; Network protocols: protocol stacks, TCP/IP, IP address; Network devices: NIC, WLAN cards, cables, hub and switch.

Computer Networks and Internet
Introduction to computer networks: circuit switching, packet switching; Internet architecture and TCP/IP: access networks, ISP, TCP/IP, routers, Internet exchange and backbone; Protocol layering: TCP/IP five layer model vs OSI seven layer model, encapsulation/de-capapsulation.

TCP/IP Protocol Suite
Application layer: HTTP, SMTP, POP, FTP; Transport layer: TCP, UDP, port number; Network layer: IP packets, IP addressing, subnetting, VLSM, routing protocols, ICMP; Link Layer: error detection, link layer addressing, ARP, DHCP; MAC sub-layer and LANs: Ethernet, hubs and switches.

Local Area Networks
LAN Structure, medium access control, logical link control; Random Access: ALOHA, slotted ALOHA, CSMA, CSMA/CD; Scheduling Medium Access Control: Reservation, Polling, Token Passing Rings; LAN standards: Ethernet, Fast Ethernet, Gigabit Ethernet, Token Rings and FDDI; Wireless LANs: 802.11.

Data Transmission and Transmission Media
Physical layer: digital and analog, transforming data to signals, transmission modes, multiplexing, asynchronous/synchronous communications, data encoding, RS232, ASCII; Transmission media: guided and wireless media, media comparison.

**Laboratory Experiment:**
Nil

**Teaching Pattern**
Duration of course: 1 semester
Suggested lecture/tutorial/laboratory mix: Lecture Hour: 26 hours
                              Tutorial Hour: 13 hours
                              Laboratory Hour: N/A

**Assessment Pattern:**
Examination duration: 2 hours, at the end of the semester
Percentage of coursework, examination, etc.: 30% CW; 70 % Exam

For a student to pass the module, at least 30% of the maximum mark for the examination must be obtained.

**Pre-requisites:** (please quote course code and title)
Nil

**Pre-cursor:** (please quote course code and title)
Nil

**Exclusive Course:** (please quote course code and title)
EE3010 Data Communications and LANs (For BEECE & BEECE2 Students ONLY)

**Equivalent Courses:** (please quote course code and title)
Nil

**Equivalent to the Old Course Code and Title:**
EE2310 Networking I
or
EE3010 Data Communications and LANs
or
EE3900 Computer Networks

**Textbook:**

**Reference Book:**