**BSE 2203 Computer Networks and Data Communication (4 CU)**

**Course Description:** This course will cover Introduction to Networks: definition, advantages, types, configurations; The OSI/ISO reference model; Transmission media: magnetic media, twisted pair, coaxial, fiber-optics; Data encoding: straight, Manchester, differential Manchester, satellite; Digital versus Analog transmission; Modems, modulation and their standards, codes and pulse code modulation; Integrated Services Digital Networks (ISDN); Network Access Protocols; Passive versus dynamic allocation; LAN standards:802.3 (Ethernet), 802.4 (token bus), 802.5 (token ring); Computer Network security, Active and Passive Attacks; Network layer and Network layer protocols; Transport layer and Transport layer protocols. Furthermore, the course considers problems on each layer of a multilayered communication model, and describes some typical solutions to such problems.

**Aims**: the aims of the course are

* networks
  + To introduce students to standards and guidelines in computer and data communication networks
  + To impact knowledge and skill relevant for the design, implementation and maintenance of modern computer communication networks
  + To introduce students to emerging technologies in data communication

**Indicative Content:** This course will adopt an enterprise management perspective with the aim to develop

**Learning outcomes**: On completion of this course unit, the students will be able to:

• Master the terminology and concepts of the OSI reference model and the TCP/IP reference model;

• Master the concepts of protocols, network interfaces, and design/performance issues in local area networks and wide area networks;

• Demonstrate knowledge of wireless networking concepts;

• Appreciate contemporary issues in networking technologies and;

• Demonstrate knowledge of network tools.

**Teaching and learning pattern**: The course will be delivered inform of lectures, tutorials, lab experimentation, and group assignments

**Indicative content**:

• Network services and applications: DNS, HTTP, SMTP, peer-to peer systems

• Network transport architectures, TCP, UDP, TCP congestion control

• Routing and forwarding, intra-domain, inter-domain routing algorithms and Mobile IP

• Link layers and local area networks, Ethernet, WiFi, and mobility

• Multimedia communications and quality of service

• Network measurement, inference, and management

• Network security (ACL, IPSec, etc)

• Network programming

• Network experimentation and performance analysis

• Protocol verification

**Assessment method**: Assessment will be in terms of tests and Assignment (40%) and final examination

(60%)

**Reference books**:

(i) James F. Kurose and Keith W. Ross. Computer Networking - A Top down Approach Featuring the

Internet, 3rd edition, Addison-Wesley, ISBN 0- 321-22735-2.

**(ii)** Computer Networks: A Systems Approach. L. Peterson and B. Davie. Morgan Kauffmann

Publishers, 2003, 3rd Edition.