VIETNAM NATIONAL UNIVERSITY OF HO CHI MINH CITY
UNIVERSITY OF NATURAL SCIENCES
FACULTY OF INFORMATION TECHNOLOGY

COURSE SYLLABUS

Course Code: TH501

Title: Advanced Computer Networks

Credits: 4

Workload:
Lecture hours: **3** periods * **15** weeks = **45** periods
Laboratory hours: **2** periods * **15** weeks = **30** periods
Preparative hours: **3** periods * **15** weeks = **45** periods

Prerequisites: TH102 – Computer Networks

TH111 – Advanced Operating Systems

Course Objectives:

The subject provides students with the concepts of Open Systems Interconnection. The functions and the structure of every layer, the issues of the protocols in each layer, the algorithms dealing with them, and the requirements of the network connections will be covered.

Main Text: N/A

References:

- *Computer networks*
  Andrew S. Tanenbaum ._USA : Prentice Hall PTR , 1996.
- *Handbook of computer - communications (volume 1,2,3)*
  William Stallings ._USA : Macmillan Computer Publishing ,1994.
- *Internetworking With TCP/IP (volume 1, 2, 3)*
  Douglas E Comer ._USA : Prentice Hall , 1995.
- *Network Protocol Handbook*
  Matthew Naugle ._USA : McGRAW HILL 1995.

Course Outline:

Chapter 1 : Introduction to Open Systems Interconnection (OSI) (4 lecture periods)

1. Introduction to layered architectures
2. Layer classification principles in a layered architecture
3. Introduction to ISO's OSI, IBM's SNA, and DEC's DNA
4. Principles in building OSI
5. Layers' services, wired communication protocols, and wireless communication protocols

Chapter 2 : Physical layer of OSI (4 lecture periods)

1. Roles and functions of the physical layer
2. Synchronous and asynchronous communication protocol
3. Relationship between DTE and DCE
4. EIA 232 D standard

Chapter 3 : Data link layer of OSI (4 lecture periods + 4 lab periods)

1. Roles and functions of the data link layer
2. Problems in data link layer: error correction and flow control
3. Character-oriented and bit-oriented protocols
4. Error correction and flow control in data link layer
5. CRC algorithm

Chapter 4 : Data link layer in LAN (4 lecture periods + 2 lab periods)

1. MAC and LLC layers
2. Requirements of multi-access networks and algorithms to solve multi-access problems (conditional and unconditional)

Chapter 5 : Network layer of OSI (4 lecture periods + 6 lab periods)

1. Roles and functions of the network layers
2. Relationship between IS and ES, IS - IS and IS - ES protocols
3. Path finding and congestion prevention in networks
4. Problems of inter-network connection
5. IP protocol and relational protocol (ICMP, ARP, RARP, DHCP, and BOOTP).
6. Opereation principles of routers in an area

Chapter 6 : Path finding algorithms in networks (4 lecture periods + 4 lab periods)

1. Flooding algorithm
2. Shortest path finding algorithm
3. Isolation algorithm
4. Static Routing.
5. Distance Vector Routing

Chapter 7 : Congestion prevention algorithm in networks (3 lecture periods)

1. Motivation and requirement of congestion prevention problem
2. Data packet removal algorithm
3. Channel control algorithms
4. Network control algorithms

Chapter 8 : Transport layer of OSI (6 lecture periods + 6 lab periods)

1. Roles and function of the transport layer
2. Relationships and necessity of network layer and transport layer
3. Functions and communication units in transport layer

4. Problems of establishment, maintenance, and removal of connection in transport layer
5. TCP and UDP protocols and Winsock

Chapter 9 : Session layer of OSI (2 lecture periods)

1. Roles and functions of the session layer
2. Relationships between session layer and other layers
3. Synchronization points , session layer tokens
4. Operation mechanism of the two entities in session layer

Chapter 10 : Presentation layer of OSI (2 lecture periods + 2 lab periods)

1. Roles and functions of the presentation layer
2. Contexts in data communication. Introduction to ASN 1
3. Data encoding and some algorithms for data encoding
4. Data compression and Huffman algorithm

Chapter 11 : Application layer of OSI (2 lecture periods + 2 lab periods)

1. Roles and functions of the application layer
2. Application entities and connection objects
3. Application connection standards (ACSE, CCRSE, RTSE, ROSE, etc)

Chapter 12 : Some problems in network administration and some services in networks (4 lecture periods + 4 lab periods)

1. Demand for network administration, administrating entities and administrated entities
2. Administration protocol SNMP
3. HP's Open View network administration system
4. Domain name Service
5. World Wide Web and HTML
6. Email

Grading Final exam :

Assignments: