

IT511 Syllabus

Fundamentals of Data Communications and TCP/IP Networking

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Course Objective:

This course provides an opportunity to learn issues involved in data communication and data networks and give the participants an overview of both concepts. The course will begin with the fundamentals of data communication and basic concepts associated with data transmission and data communication techniques will be presented to introduce the participants to communication. In the second part of the course, we'll introduce the concept of internetworking and work on the fundamentals of the TCP/IP protocol suite.

Hands-on laboratory sessions will be conducted on how to install, and configuration of TCP/IP services such as DNS, Load Balancer, and HTTP.

Course Outline:

A. Fundamentals of Data Communications

- Data Communications and Networking
- Evolution of Networks
- The Process of Communication
- Transmission Media
- Transmission Modes
- Classification of Networks

B. TCP/IP Networking

- Introduction to TCP/IP
- TCP/IP Protocol layering concepts
- OSI and TCP/IP Reference Models
- Internet Protocol (IP)
- Transfer Control Protocol (TCP)
- Network Protocols (ARP, ICMP)
- Application Protocols in Computer Network
- Application Services

Laboratory Workshop:

A. Packet Analysis

- Packet sniffing and protocol analysis using Wireshark

B. Internet Services Lab

- Domain Registration (<https://www.freenom.com/>)
- Installing/configuring DNS (PowerDNS)
- Installing/configuring Load Balancer (HAProxy)
- Installing/configuring Web Server (Apache)

C. Data Security Lab

- Installing/configuring self-signed SSL Certificate
- Installing/configuring free SSL Certificate (Let's Encrypt)

Grading:

- 40% Final exam
- 40% Home Works
- 20% Lab Participation

Resources:

Relevant reading material (online or downloadable) will be made available throughout the length of the course.

1. The TCP/IP Guide by Charles M. Kozierok (http://www.tcpipguide.com/free/t_toc.htm)
2. You can find tons of other useful resources on the Internet via a simple search (sample keywords: Data Communication and Computer Network Tutorial)