

SY205 Syllabus

Course Learning Outcomes

Through the course and collective efforts of the students, students will be able to:

- Describe the models used in networking
- Describe the technologies used in networking
- Build wired networks
- Capture and analyze network communications
- Operate in networks architected for security
- Conduct operations from a command line interface

Course Themes

Across the course content the following themes are used to tie topics together:

- Capturing network traffic and analyzing network protocols in action
- Defensive and offensive applications

Course Topics

SY205 is organized into nine sections: Numeral Systems, Command Line Interface, Networking Fundamentals, Physical and Data Link Layer, Network Layer, Transport Layer, Application Layer, Network Operations, Modern Internet Networking. Each of the sections has topics with learning outcomes.

Numeral Systems.

- Numeral System Basics
- Bitwise Operations

Command Line Interface (CLI).

- Command Line Basics
- File System Commands
- UGO Permissions
- Basic Utilities
- CLI Redirections

Networking Fundamentals.

- OSI Model
- TCP/IP Model

- Networking Techniques and Topologies

Physical Layer and Data Link Layer.

- Physical Layer
- Data Link Layer
- Ethernet Networking
- Packet Capture Techniques
- Address Resolution Protocol (ARP)

Network Layer.

- Internet Protocol version 4 (IPv4)
- IPv4 Addressing Techniques
- Basic IP Routing
- Internet Control Message Protocol (ICMP)

Transport Layer.

- User Datagram Protocol (UDP)
- Transport Control Protocol (TCP)

Application Layer.

- Domain Name System (DNS)
- Dynamic Host Configuration Protocol (DHCP)
- HyperText Transfer Protocol (HTTP)
- Simple Mail Transfer Protocol (SMTP)

Network Operations.

- Network Segmentation
- Firewalls
- Network Mapping Techniques

Modern Internet Networking.

- Modern Internet Architecture
- Network Address Translation
- Internet Protocol version 6 (IPv6)
- Border Gateway Protocol (BGP)