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)

Contract of Learning

Draft and sign a Contract of Learning. Turn in a signed contract of learning to your instructor by the beginning of the second week of the course.

Student Information Sheet

Draft a Student Information Sheet. Turn in a student information sheet to your instructor by the beginning of the second week of the course.

Instructor Information

LCDR Hoffmeister

Instructor Schedule. I am generally in my office outside of class and reoccurring commitments. Walk-ins are welcome, appointments are not required; appointments will be seen over walk-ins. I periodically check my email outside of the Academic Day.

See LCDR Hoffmeister (USNA intranet faculty website) to view and sign up for available meeting times.

Miscellaneous Information

Cyber Guest Lectures, Conference, Summit, and Workshop Etiquette

Sharing ideas is common practice, and is an excellent way to build new relationships and strengthen existing relationships. As a Cyber Operations major you will attend cyber guest lectures, and cyber related conferences. You will automatically be put on an excusal list as a Cyber Operations major, and therefore will be expected to attend. The guest lectures and conferences are not associated to a specific course in the major but the major overall, therefore do not expect to be compensated for in class time. You are expected to attend lunchtime cyber guest lectures, and maximize attendance at conference events.

Important: Lunchtime cyber guest lectures for Cyber Operations majors are considered a *scheduled class* (MIDREGS Priority 8).

You know how you are performing in your other classes the best. Do not let attending cyber related conferences put you in a tough situation academically — your current grades are more important than potential projects.

Specific cyber domain related guest lectures and conferences will be listed on the course calendar. The below list indicates the cyber conferences that we will attend as part of the Cyber Operations major.

Important: Even if you are put an excusal list automatically, discuss your attendance at the conference with instructors of other courses.

- 10 Sep 2019: TBD, Cyber Guest Lecture *potential*
- 01 Oct 2019: TBD, Cyber Guest Lecture *potential*
- 08 Oct 2019: Ms. Juliane Gallina, CIA CIO, Cyber Guest Lecture *confirmed*
- 19 Nov 2019: TBD, Cyber Guest Lecture *potential*

Lecture Etiquette

In academia it is common for conferences to occur during the academic term so that students (new members in the community) can attend and participate in sharing ideas. Unfortunately, conference schedules do not align with class schedules. It is understood that people, especially students, may join a presentation late or may leave a presentation early.

Even though it is common for conference attendees to come and go during a presentation, attendees need to be considerate if they need to come late or leave early. If you know you will need to leave a presentation early then choose your seat accordingly (near an aisle, near an exit). If you know you will be arriving late then enter quietly and choose a readily accessible seat. Avoid saving seats for colleagues in the middle of a seating area in order to allow colleagues to quickly sit. Avoid waving or signaling colleagues in order to avoid distracting the presenter.

Course History

A brief history of SY205.

The course calendar system was designed by LCDR Jeff Kenney and is available at GitHub. The calendar uses CSS from the Skeleton CSS library at getskeleton.com (MIT License), and the Bootstrap libraries at getbootstrap.com.