Master of Science in Cybersecurity

Syllabus for CYB 703 Network Security

NOTE: This syllabus document contains the basic information of this course. The most current syllabus is available in the full course.

Course Description

This course offers the basic knowledge of architectures, cyber threats, vulnerabilities, and defensive techniques for securing networks. The course addresses firewall functionalities, configurations, and managements. Different Architectures of VPNs for securing communication assets are presented with various implementation considerations. Students learn essentials of network analysis tools, monitoring, and policy development.

Prerequisite(s)

None

Program Outcomes

This course addresses the following competencies and program outcomes of the Master of Science in Cybersecurity:

- Program Learning Outcome 2: Networking and Network Defense - Analyze network infrastructures and protect them against threats.

Course Outcomes

Upon completing this course, you will be able to do the following:

- Explain the fundamental concepts of network security and defensive techniques.
- Describe common network architectures, topologies, components, technologies, and infrastructures and incorporate them into a secure network design.
- Understand the impact that malicious exploits, network vulnerabilities, and cyber-attacks have on network security.
- Explain the fundamental functions of network analysis, monitoring, and mapping tools such as Wireshark, NetWitness Investigator, Nmap, and pfSense.
- Describe the fundamental functions performed by firewalls, common firewall technologies, and the elements of firewall configuration.
- Describe the fundamental functions of virtual private networks (VPNs), common VPN technologies, and the elements of VPN management.
- Track the implementation of a firewall and a VPN.
- Apply basic penetration testing techniques to identify potential vulnerabilities and determine whether network defenses components are sufficient.
- Identify security policies and network security management best practices.
- Evaluate regulations, network operational procedures, and emerging network security technologies.

Course Requirements/Components

Quizzes
There is a quiz at the end of each module. The quiz consists of randomized multiple-choice and true/false questions based on the readings for that module. These quizzes are meant to ensure that you understand foundational concepts and terms related to network security.

Discussions
There are numerous discussions related to the topic being explored for modules. There is also a class introduction discussion during the first week of class.

Lab Assignments
Several lab assignments will be given during the term. These are hands-on small lab exercises. These assignments will require you to access a virtual desktop to complete tasks related to analyzing network protocols and conducting penetration tests. Required tasks are your opportunity to gain valuable hands-on experience with professional-grade tools and techniques as you work through the guided lab exercises provided in the on-screen lab manual. The use of virtualization enables you to perform all the tasks in the lab manual in a live environment without putting your personal device or institution's assets at risk. The labs can take a substantial amount of time to complete so don't wait until the last minute to attempt them. I suggest that you play around with the lab tasks in the weeks leading up to the submission deadline.

Final Project
You will be required to design and explain network infrastructure for a mock company. Requirements will be provided in the form of an asset list along with typical functions. You will then have to come up with the topology, network schematics along with detailed firewall settings.

Grading
The following grading scale will be used to evaluate all course requirements and to determine your final grade:

Grade	Percentage Range
A	94% - 100%
A-	90% - < 94%
B+	87% - 90%
B	84% - 87%
B-	80% - 84%
C+	77% - < 80%
C	74% - 77%
C-	70% - 74%
F	0 - < 70%

Assignments	Percentage
Quizzes	25%
Lab Assignments	20%
Discussions	35%
Final Project	20%
Total	100%