Fall 2020

CS 357-101: Fundamentals of Network Security

Roberto Rubino

Fundamentals of Network Security

Course No. CS 357

Section 101

Title Fundamentals of Network Security

Course Website Course related materials will be posted on NJIT's Canvas system

Prerequisite(s) CS 356 or IT 420

Meeting Schedule

ebex
pm -
class will

manner.
ctures will

Instructor Roberto D. Rubino

- Email : rr8@njit.edu

Instructor Office Hours

Description This course offers an in depth study of network security issues, types of computer and network attacks, and effective defenses. It provides both a theoretical foundation in the area of security and hands-on experience with various attack tools, firewalls, and intrusion detection systems. Topics include: network scanning, TCP/IP stack fingerprinting, system vulnerability analysis,

buffer overflows, password cracking, session hijacking, denial of service attacks, and intrusion detection.

Learning Outcomes:

cific security goals for communication
rks.

- Analyze the security of the
Internet to secure communicat
systems at various network lay
network, transport, and applica

ng the course, students will be

the appropriate security primitives that should be

- Describe common attacks against wired and wireless network protocols using standard terminology, allowing them to communicate effectively with other security professionals.
- Assess whether a given communication protocol achieves the desired security goals.
- Gain an understanding of attacks against web applications and of design principles for effective defenses.

Topics

- Introduction
  - Fundamental Concepts
  - Access Control Models
  - Cryptographic Concepts
  - Efficiency and Usability
- Network Security
  - Concepts
  - The Link Layer
  - The Network Layer
  - The Transport Layer
  - Denial-of-Service Attacks
  - The Application Layer and DNS
  - Firewalls

- Tunneling
- Intrusion Detection
- Wireless Networking
- Tools for reconnaissance, defense and attacks

Topics are subject to change or omission, depending on time.

Text Book(s) Due to the dynamic and evolving nature of the network security field,

the course will feature a mixture of material based on the optional recommended textbook, on instructor notes and on scientific articles in order to reflect recent developments in this area.

1) OPTIONAL: Introduction to Computer Security by Michael T. Goodrich & Roberto Tamassia Hardcover: 576 pages Publisher: Addison Wesley; Copyright: 2011 ISBN: 0-321-51294-4

2) WEB MATERIAL AND HANDOUTS: Additional material will be posted on the course's associated Canvas page.

Grading Two quizzes: 30% Midterm exam: 25% Project: 15% Final exam: 30%

There will also be several opportunities to earn extra credit.

The midterm and final exam will be administered via Canvas using Respondus Monitor and LockDown Browser. Please plan accordingly.

Scale: A (superior): 90-100 B+ (excellent):

85-89 B (very good):
80-84 C+ (good): 75-79 C
(acceptable) 70-74 D
(minimum): 60-69 F:
(inadequate): < 60

Academic Integrity:

Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: http://www5.njit.edu/policies/sites/policies/files/academic-integrity- code.pdf.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu.

Modifications to Syllabus

may be modified at the discretion of the
n the event of extenuating circumstances.
be notified in class of any changes to the