National University of Computer & Emerging Sciences

Department of Computer Science

CS411 – Network Security

SPRING 2020

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Office Location:	Library Building First Floor
Office Hours:	Mondays, Wednesdays, and Fridays 11:00 AM – 12 Noon or by appointment
TA Name:	Miss Saira Arif (Section A), Miss Fatima Fayyaz (Section B)
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Course Program:	BS
Credit Hours:	3
Type:	Elective (soon to be core)
Pre-requisites:	Computer Networks, Optional: Operating Systems
Course Website:	SLATE
Class Meeting Time:	Tuesdays and Thursdays – 11:00 AM to 12:30 PM Section A Tuesdays and Thursdays – 1230 PM to 1:50 PM Section B
Class Venue:	CS 3

Course Description

Network Security is a course on understanding the security issues, principals, concepts and mechanisms of information & communication technologies. It is NOT a course on Networks, NOT a course on Cryptography, NOT a course on Software Engineering. But the issues concerning all of them that can be exploited to generate attacks on networks and systems. “Perfect security is a myth” but best selection, implementation and mitigation can achieve a great level of security.

Course Book

Software Engineering, 10th Eidtion, Ian Sommerville
Computer Security: A Hands on Approach, Wenliang Du (Chapter 4 and 13 will be uploaded to SLATE)
Cryptography Network Security: Principal and Practice by William Stallings.
Hand outs from other books will be provided

Course Outline: Introduction to computer security principles: authentication, authorization, integrity, Cryptography, OS security issues and vulnerabilities, security requirements at different layers of the TCP/IP stack, IP Security, Wireless Security, Web Security issues. Introduction to possible attacks and the defense mechanisms to the information systems, software engineering techniques to minimize security vulnerabilities.

Grading

Absolute grading scheme will be used

>= 90	A+
86 – 89	A
82 – 85	A-
78 – 81	B+
74 – 77	B
70 – 73	B-

66 – 69 C+
62 – 65 C
58 – 61 C-
54 – 57 D+
50 – 53 D

Old Grade Distribution

Final	40%
Midterm	10+10=20%
Quizzes	3.33+3.33+3.33=10%
Kali Linux Tool Demo	10%
Assignments	5+5+5+5=20%

NEW Grade Distribution

Final	50%
Midterm	10%
Quizzes	3%
Kali Linux Tool Demo	3+7=10%
Assignments	5+5+4+4=18%
Research Project	9 %

Tentative Lecture Plan

Week	Topic Covered	Activities
1	Introduction to security concepts	
2	Introduction to security concepts	
3	Cryptography	**Quiz 1**
4	Secret and Public Key Cryptography	
5	Hashes and PKI	**Assign 1 Due**
6	Buffer Overflow Attack	**Midterm 1**
7	Authentication	**Initial Tool Demo to TAs and Assign 2 Due**
8	Access Control	
9	SSL-TLS	**Quiz 2 and Assign 3 Due**
10	Wireless Security	
11	IP Security	
12	TCP Attacks	**Midterm 2**
13	Secure Software Development Lifecycle Processes	**In Class Tool Demo and Assign 4 Due**
14	Security Specification Languages	**In Class Tool Demo**
15	Secure Design Guidelines and Patterns	**Quiz 3**
16	Advanced topics	
17		**Final**

Notes

Quizzes can be on any day of the week indicated
Assignments will be due on Friday at 12 Noon of the week indicated
The VM of the Ubuntu machine for attack exercises is at www.cis.syr.edu/~wedu/seed or https://seedsecuritylabs.org/ (3.3 GB)

Kali Linux for tool demo can be downloaded from kali.org. Read the website and tutorials. (11GB – USB required)