

The University of Jordan
School of Engineering
Department of Computer Engineering
Spring Term – A.Y. 2023 - 2024



Course:	Special Topics in Computer Engineering – 0907531 (3 Cr)
Catalog Data:	This course introduces fundamental security aspects in computer networks and wireless telecommunications. Topics include introducing security protocols for: Email Security, Transport-Level Security, IP Security, LAN Security, switch and Ethernet security, DHCP and ARP security, Wireless Network Security Protocols, WEP, WPA1, and WPA2
Prerequisites by Course:	Information and Networks Security (0907520)
Prerequisites by topics:	Students are assumed to have had sufficient knowledge pertaining to computer networks.
Textbook:	<ol style="list-style-type: none">1- Cryptography and Network Security: Principles and Practice, Sixth Edition, Pearson, 20142- LAN Switch Security: What Hackers Know About Your Switch, Cisco Press, 20083- Hacking Exposed Wireless: Wireless Security Secrets & Solutions, McGraw-Hill Osborne Media, 2014
References:	Introduction to computer security/ Michael Goodrich, Roberto Tamassia. Harlow: Pearson Education ; 2014 Network Security Essentials: Applications and Standards, 6th ed., by William Stallings, Pearson Education, Inc., 2016.
Resources	Additional resources will be posted on MS Teams
Schedule & Duration:	Section 1: 14 Weeks, 42 lectures, 50 minutes each (including exams). Section 2: 14 Weeks, 28 lectures, 75 minutes each (including exams).
Minimum Student Material:	Textbook, class handouts, instructor keynotes, calculator and access to a personal computer and internet.
Minimum College Facilities:	Classroom with whiteboard and projection display facilities, library, and computational facilities.
Course Objectives:	To introduce various Wireless networks and LAN technologies and protocols, and study the vulnerabilities, attacking techniques and countermeasures in Wireless networks and LANs. Also, study email security, transport layer security, and network layer security.
Course Outcomes and Relation to ABET Program Outcomes:	Upon successful completion of this course, a student should be able to: <ol style="list-style-type: none">1. Understand current communication protocols, existing vulnerabilities, and security mechanisms and solutions for wired and wireless local area networks. [1]

2. Decide when and how to use different security protocols which work at different network layers, and understand how they are integrated with each other. [7]
3. Discover and exploit vulnerabilities in different network protocols [1]
4. Do the proper configuration of switch, port security, VLAN configuration and switch policies to mitigate and prevent different wired LAN and VLAN attacks. [1][7]
5. Do the proper configuration of access points to mitigate and prevent different wireless LAN attacks. [1][7]

Course Topics:

1. Introduction to network security,
2. Email security
3. Transport layer security
4. IP security
5. Ethernet, VLANs, 802.1Q, VTP, DTP, and STP protocols
6. VLANs attacks, STP attacks, DTP attacks, and switch learning attacks
7. ARP protocol and attacks, DHCP protocol and attacks, port security
8. Sniffing (passive and active), MAC flooding, several scenarios and tools for sniffing
9. Man-in-the-middle-attacks, several scenarios on MITMA
10. IEEE 802.11 standard
11. Scanning and Enumeration 802.11 Networks
12. Understanding WEP/WPA/WPA2/WPA3 Algorithms
13. Defeating IEEE 802.11 algorithms
14. Attacking the WLAN Infrastructure – Rogues Devices, Evil Twins, DoS Attacks, MITM, Wi-Fi Protected Setup

Assessments:

Quizzes, assignments, and Exams.

Grading policy:

Midterm Exam	30%
Quizzes + Assignments	20%
Final Exam	50%

Instructors:

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 Office Hours: Sun, Tue, Thu 10:30 – 11:30

Program Outcomes (PO)

1	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2	an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3	an ability to communicate effectively with a range of audiences
4	an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5	an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6	an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7	an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Last Updated:

FEB 14, 2024