

EECE655 INTERNET SECURITY
AMERICAN UNIVERSITY OF BEIRUT
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
COURSE SYLLABUS
FALL 2015

COURSE TITLE: Internet Security

INSTRUCTOR: Imad H. Elhajj

OFFICE HOURS:

MWF 9am-10am and by appointment

Office: TBD

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CATALOG DESCRIPTION:

The course covers topics in Internet security. The course discusses security threats, vulnerabilities of protocols and the different types of attacks. Preventive and defensive mechanisms are covered; such as: email security, web security, IP security, network management security, wireless security, intrusion detection techniques, firewalls, VPNs and tracing the source of attacks. Student projects will be composed of implementation, simulation and research components.

PREREQUISITES:

By course: EECE 450

Recommended: EECE632

By topic: Internet protocols (IP, TCP, UDP, ARP, DNS, DHCP), internet routing, basic knowledge of socket programming, cryptography and computer security.

MATERIAL ON RESERVE AND ONLINE:

Papers and electronic material will be posted on Moodle

TOPICS COVERED:

- *Introduction:* Internet security threats, economic impact and terminology
- *Vulnerabilities of Internet protocols:* ARP, IP, TCP, DNS and routing
- *Attacks:* ARP cache poisoning, Packet sniffing, IP Spoofing, IP fragmentation attacks, ICMP attacks, TCP session hijacking, SYN flooding attack, Denial of service attacks, IP Routing attacks, DNS attacks, Port scanning, Cookie poisoning, Buffer overflow and SQL injection.
- *Finding and fixing some of the vulnerabilities*
- *Security Protocols:* PGP, S/MIME, SSL, IPsec, and SNMP
- *Security Prevention and Detection:* Firewalls, VPNs and intrusion detection systems
- *Attack source tracing and digital forensics*

COURSE OBJECTIVES: The objectives of this course are to give students:

- Advanced knowledge of Internet security threats, vulnerabilities of protocols and the different types of attacks
- Advanced knowledge of protocols, devices and tools used in securing networked applications and systems
- Advanced knowledge of current research topics and issues in Internet security
- Experience in conducting and presenting a literature review on a research topic
- Hands-on experience in analyzing and securing networked systems

LEARNING OUTCOMES: At the end of the course, students will be able to:

- Assess Internet security threats
- Estimate and assess the economic impact of network attacks
- Describe the vulnerabilities in internetworking protocols
- Describe the different Internet attacks
- Find and identify potential vulnerabilities in internets

- Describe how to resolve identified vulnerabilities
- Describe the use of cryptography in Internet security
- Describe the different security protocols used in email, web and other Internet applications
- Describe tools used for the prevention and detection of Internet attacks
- Trace the source of some types of Internet attacks
- Conduct, document and present a literature review on a topic related to Internet security
- Analyze and secure an internetworked system

ASSIGNMENTS & PROJECT:

- There will be 2 assignments during the semester. These assignments will be hands on and are well defined with detailed specifications and requirements.
- An open-ended research project will be assigned. The specific topic of this project is of your choice. You will be required to conduct a literature review, carry out simulations, implementations or testing, and present your findings.

DROP QUIZZES & FINAL:

- There will be **unannounced** quizzes during this course given at the beginning of some lectures based on previous material presented.
- The final exam will be comprehensive.

ASSESSMENT: The final grade will be based on the following weights:

Assignments	30%
Drop Quizzes	10%
Project	30%
Final Exam	30%

GENERAL RULES & REGULATIONS:

- All graded work should be based on individual effort with NO external help, unless otherwise indicated. If in doubt ask ahead of time. Any suspected misconduct will be handled according to the American University of Beirut rules and regulations. Consult the AUB's website for details of these policies.
- Any deliverables submitted are subject to scrutiny using Turnitin.com or other tools.
- Every class is considered as an appointment and thus please be on time.
- Late material is not accepted.
- No makeup for drop quizzes and exams.
- Keep checking the class Moodle for information and updates.
- As per AUB policy, students who miss more than one fifth of the lectures in the first ten weeks of the semester will be dropped from the course.

GOOD LUCK!