Course Syllabus

Course Information

Course Number/Section	CS 6324.001
Course Title	Information Security
Term	Spring 2019
Days & Times	Tuesday & Thursday: 8:30am - 9:45am
Location	ECSN 2.120

Professor Contact Information

Professor	Dr. Junia Valente
Office Phone	972-883-4537
Email Address	juniavalente@utdallas.edu
Office Hours	Per appointment

Course Pre-requisites, Co-requisites, and/or Other Restrictions

CS 5343 Algorithm Analysis and Data Structures
CS 5348 Operating Systems Concepts

Course Description

Information Security (3 semester hours) is a comprehensive study of the principles and practices of computer system security including operating system security, network security, software security, and web security. Topics include common attacking techniques such as virus, trojan, worms and memory exploits; applied cryptography, and key management; intrusion detection, Security Information Event Managers (SIEM), and security analytics; trusted computing; access control; password protection; and legal and ethical issues in computer security.

Student Learning Objectives/Outcomes

Students shall be able to understand what are the common threats faced today, what are the foundational theory behind information security, what are the basic principles and techniques when designing a secure system, how to think adversarially, how today's attacks and defenses work in practice, how to assess threats for their significance, and how to gauge the protections and limitations provided by today's technology. In particular, the students will have:

1. Ability to understand and explain fundamental security concepts
2. Ability to understand common threats and recognize vulnerabilities of information systems
3. Ability to understand and apply cryptographic algorithms
4. Ability to understand and apply network security enumeration and monitoring tools
5. Ability to understand and apply security policies

Suggested Course Materials

- "Security Engineering," Second Edition, Ross Anderson. Wiley, 2008.
- "Foundations of Security: What Every Programmer Needs to Know," Neil Daswani, Christoph Kern, Anita Kesavan. Apress, 2007.

Tentative Schedule of Topics:

Cryptography	(January – February)
- Introduction to Cryptography Concepts	
- Private Key & Public Key Cryptography	
- Hash Functions, MACs, Digital Signatures	
- Authentication, Key Establishment, Kerberos, DH key exchange	
- Man-in-the-middle, Freshness	

Network Security	(February)
- Trust, PKI, CAs, TLS, IPSec, Sniffing, Spoofing, Enumeration, Nmap	
- Vulnerability Scanning, Metasploit, DDoS, Worms, Viruses, Trojans, Botnets, DNS	
- CDNs, Firewalls, Spam Filters, Deep-packet Inspection, Log-file Analysis	
- Intrusion Detection Systems, types of IDS, Log Aggregation, SIEM	

March 5:	*Midterm*

Trusted Computing	(March)
- Trusted Computing, Hardware-assisted Security	
- Applications of Trusted Computing	

Access Control, Authorization, and Multi-Level Security	(March)
- Access Control Lists & Access Control Models	
- Covert Channels, Confidentiality Policy: Bell-LaPadula Model	
- Integrity Policies: Biba Model, Clark-Wilson	

March 19 & 21:	*No classes – Spring Break*

Economics	(March)
- Regulations (HIPAA, FERPA, Sarbanes-Oxley), Incentives, Misc. Topics	

Systems, Software & Web Security	(April)
- Design Principles (Least-Privilege, Simplicity, Fail-Safe, etc.)	
- Cross-Domain Security, SQL Injection, 0-days	
- Buffer Overflows and Countermeasures, Other Memory Attacks	
- Software Security, Static / Dynamic Analysis, Fuzzing	
- Password Security	
- Mobile Security & IoT Security	

Copyright and Digital Rights Management	(April)
- Copyright, Policy, Watermarking	
- Disk Encryption, Obfuscation, Code Flattening	

Privacy	(April)
- Privacy, Anonymity, Mix Networks, Tor	

May 2:	*No class – study on your own (tentative)*

May 7:	*Final Exam*

Be sure to fill out the course evaluation—
you will receive 5 bonus points on the Final Exam!

Grading Policy

The percentage breakdown is as follows:

Homework	**15%**
Quizzes	**20%**
Class Presentation / Project	**15%**
Midterm	**25%**
Final Exam	**25%**

Letter Grade Scale:

92-100=A	90-92=A-	
88-89=B+	82-87=B	80-81=B-
78-79=C+	72-77=C	70-71=C-
68-69=D+	62-67=D	60-61=D-
0-59=F		

Course & Instructor Policies

Turnitin
Students should turn in the final project report on eLearning at the Turnitin link by the due date.

Make-up exams
Exams must be taken at the scheduled dates and times. Special arrangements for makeup exams will be allowed *only* when there is a valid, documented reason, such as a medical emergency.

Late Work
Turning assignments on time is expected from all students. Late submissions will be subject to a penalty of 20% per each day late, up to a maximum of three days. No credit will be given for assignments submitted more than three days late. However, I will accept late assignments without penalty within 3 hours of when they are due.

Extra Credit
Students may write a 2-page report summarizing an academic article presented at a recent security conference (such as IEEE S&P'18, USENIX Security'18, or ACM CCS'18) by either reading the article or watching the presentation available online. The article should be related to this course.

The report must include: (1) a brief summary of the article, (2) what problem the author(s) attempted to solve and why the problem is important, (3) proposed solution & methodologies used, (4) summary of results and conclusions, and (5) a brief discussion stating the student's personal opinion about the article, including what they found as limitations and strengths.

The students should use the ACM 2-column LaTeX template on the Overleaf platform:
https://www.overleaf.com/gallery/tagged/acm-official

This extra credit option is available to all students. The report is due on **Thursday, April 18**.
No late submissions will be accepted. This report is worth **up to 3%** of your final grade.

Class Attendance

Class attendance is required. Per the Computer Science Department's policy, **three consecutive absences will result in the course grade being lowered by one letter, and four consecutive absences will automatically result in a failing grade (F) in the course.** If there is a legitimate reason for being absent in one or more lectures, the student should notify me immediately, and provide supporting documentation in advance (or in exceptional cases, after the student returns).

Classroom Citizenship

Students are expected to be attentive during class and to be courteous and polite during class presentations. Students are expected to listen respectfully to the professor and to other students when they are speaking. Racism, sexism, homophobia, classism, ageism, and other forms of bigotry are inappropriate to express in class. Disruptive students will be asked to leave and may be subject to disciplinary action.

Comet Creed

This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:

"As a Comet, I pledge honesty, integrity, and service in all that I do."

UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus.

Please go to http://go.utdallas.edu/syllabus-policies for these policies.

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.