

## CS 1310: CYBERSECURITY FOR BEGINNERS

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<i>Semester Hours:</i>	3.0	<i>Contact Hours:</i> 3
<i>Coordinator:</i>	Ruinian Li	
<i>Text:</i>	Readings provided by instructor	
<i>Author(s):</i>	VARIED	
<i>Year:</i>	Varied	

### SPECIFIC COURSE INFORMATION

#### *Catalog Description:*

Cyber threats in day-to-day computer use, Web security issues and countermeasures, vulnerabilities of smart phones and their mitigation, common cyber-security technologies, hands-on lab activities. Prerequisites: N/A.

Course type: **ELECTIVE**

### SPECIFIC COURSE GOALS

- I can explain the common cyber threats.
- I can use basic cybersecurity tools.
- I can securely use a browser to access the Internet.
- I can protect my computer.
- I can explain the common privacy and security issues of using a smartphone, and I can apply countermeasures.

### LIST OF TOPICS COVERED

- Nuts-and-Bolts of cyber-security (~7%)
  - A big picture of the problem: computers, smartphones, the Internet, and threats
  - Key components (hardware and software) of a computer, and how they work together
  - Representing and storing information in digital form
    - E.g., how a computer processes and stores an English word, etc.
  - Pillars of information security: confidentiality, integrity, and availability
- Ethics and Economics of cybersecurity (~15%)

- Tension between cost and security
- Tradeoff between usability and security
- Individual privacy vs. law enforcement
- Ethical hacking
- Fun with encryption/decryption schemes (~7%)
  - Overview of one popular encryption/decryption algorithm
  - Symmetric key system vs. public/private key system.
- On Password-based authentication (~7%)
  - Measuring the strength of a password
  - Tools for cracking password, etc.
  - How CAPTCHA helps against password cracking
- Access control and authentication (~14%)
  - Access control (i.e., read, write, execute permission) of a file in a computer
  - Usage of a one-way hash function
  - How a computer recognizes a user (user authentication)
    - Case study: Linux system's scheme for access control and user authentication
  - Newer authentication schemes
    - Single-Sign-On (e.g., accessing Canvas via my.bgsu.edu)
    - Multi-factor authentication (e.g., DUO code to login to my.bgsu.edu)
- Security issues in computer networks and web browsing (~15%)
  - Basic structure/architecture of the Internet
    - LAN, subnet, IP address.
  - Security issues of home/public Wi-Fi; attacks on a web session
    - Man-in-the-middle attack
    - Sniffing computer network traffic (Wireshark tool)
    - Stealing Cookie
  - Countermeasures
    - Public key infrastructure (PKI), Virtual Private Network (VPN).
- Software vulnerability/maliciousness. (~7%)
  - Security issue/hole in software
  - Intentional maliciousness vs. unintentional vulnerability.

- Common schemes of cyber-attacks and countermeasures: (~7%)
  - Social Engineering, phishing, drive-by-download, clicking email-attachment
  - Spyware, adware, ransomware
- Security and privacy issues of smartphones (~7%)
  - Basic design of an android/iPhone app
  - Common threats and Countermeasures
- Security and privacy issues of online social networks (~7%)
  - Privacy issues in sharing information publicly
  - Common threats and Countermeasures
- Protecting a personal computer (~7%)
  - Why to run only updated software on a computer
  - How to safely install software only from a trusted party
  - Running an antimalware (and firewall) to protect a computer