USC Viterbi
School of Engineering

# ITP 499 How Not To Get Hacked: Personal Cyber Security

**Units:** 2
**110 minutes once per week**
**Location:** TBD


## Instructor: Gregg Ibbotson

**Office:** RRB 221
**Office Hours:** TBD
**Contact Info:** ibbotson@usc.edu

## Teaching Assistant:

**Office:** Zoom
**Office Hours: TBD**
**Contact Info:** Via Brightspace platform


## Catalogue Description

Cyber security concepts for personal protection, protecting your devices and information, protecting yourself and your family online, using encryption safely.

## Course Description

This course provides an overview of personal device protection, from laptops to smartphones to internet-connected devices. This Includes strategies to better protect your personal devices, web browsers, and personal messages. The course covers personal device and electronic communications security providing insights on how to detect and defend yourself against potential social engineering attacks.
Students will develop their interpersonal and communication skills and the application of their technical knowledge through interactive class activities and hands-on projects.

## Learning Objectives

Upon completing this course, you will be able to:

- Interpret and recognize the fundamentals of cyber security for your personal devices and data
- Identify cyber security threats and solve weaknesses to secure your devices
- Defend your laptop and smartphone browsers against attacks and tracking
- Recognize social engineering attacks and techniques and protect yourself against them
- Devise and appraise methods to protect your device operating system and software
- Evaluate best practices for cyber security maturity
- Formulate and explain cyber security recommendations that establish the intersection of security and management for your future employer

**Prerequisite(s): NONE**
**Co-Requisite(s): NONE**
**Concurrent Enrollment: NONE**
**Recommended Preparation:** None. This introductory course will guide students toward the learning objectives without any prior specialized technical knowledge

## Course Notes

The course is letter-graded, with all materials and assignments on Brightspace. Assignments will be conducted in and out of class.

## Technological Proficiency and Hardware/Software Required

It is assumed that the student has baseline technical knowledge (basic computer usage, basic internet usage)

## Required Readings and Supplementary Materials

All course materials will be posted on Brightspace.

## Optional Readings and Supplementary Materials

Computer Basics: Understanding Operating Systems (gcfglobal.org)
https://nationalcareers.service.gov.uk/careers-advice/interview-advice/the-star-method
Microsoft Zero Trust Model (link will download a pdf doc)
http://www.pearsonitcertification.com/articles/article.aspx?p=30077&seqNum=6

## Description of Assignments and How They Will Be Assessed

The assignments will be a combination of in-class and out-of-class exercises. They will typically involve some form of procedural work (instructions provided), with some reflection on the work performed including researching processes and procedures performed. All exercises will be graded on a point scale, between 10 and 20 points.

## Assignment Overview and Learning Objective Mapping

| Assignment | Learning Objective |
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| Assignment 1 Computer Virus report – Exploration of virus types, their impact on a personal device, and how best to secure the device against a future attack | Interpret and recognize the fundamentals of cyber security for your personal devices and data<br><br>Identify cyber security threats and solve weaknesses to secure your devices |
| Assignment 2 - Web browser hardening guide – Students will apply their knowledge of cyber security fundamentals to explain and document best practices for security in a variety of web browsers, both laptop and phone | Interpret and recognize the fundamentals of cyber security for your personal devices and data<br><br>Identify cyber security threats and solve weaknesses to secure your devices<br><br>Defend your laptop and smartphone browsers against attacks and tracking<br><br>Devise and appraise methods to protect your device operating system and software |
| Assignment 3 - Social Engineering Playbook - Students will practice the first stage of social engineering by performing the research phase of a whale phishing attack. | Recognize social engineering attacks and techniques and protected yourself against them |
| Assignment 4 – How to protect your personal devices guide. Students will apply their knowledge of cyber security fundamentals to explain and document best practices to harden personal devices – laptops / smartphones | Interpret and recognize the fundamentals of information security in a business and personal setting.<br><br>Identify critical cyber security threats |
| Assignment 5 – Actively protecting your personal device – You will now install, set up, and evaluate a chosen security method from your previous assignment (4). This can include the use of end-point protection software Ex. BitLocker, FileVault | Identify cyber security threats and solve weaknesses to secure your devices<br><br>Defend your laptop and smartphone browsers against attacks and tracking<br><br>Devise and appraise methods to protect your device operating system and software<br><br>Evaluate best practices for cyber security maturity |

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| Assignment 6 - Security Policy Design and Communication – produce a security policy of your choice to mitigate given security issues within the case study. Detail how it will be communicated and competence measured. | Formulate and explain cyber security recommendations that establish the intersection of security and management for your future employer |
| Assignment 7 – Keeping yourself and your family Safe Online – A presentation – summarizing your knowledge of this class, produce and present a demonstration of security recommendations to a non-technical audience. This is a group presentation, each student has 4 minutes to present, with no more than 4 slides each. | Evaluate best practices for cyber security maturity |

## Grading Breakdown

| Assessment Tool | Grade % |
|---|---|
| Assignments 1 -7 (10% each) | 70 |
| Midterm | 15 |
| Final Exam | 15 |
| **Total** | **100** |

## Grading Scale

Course final grades will be determined using the following scale

| | |
|---|---|
| A | 93-100 |
| A- | 90-92 |
| B+ | 87-89 |
| B | 83-86 |
| B- | 80-82 |
| C+ | 77-79 |
| C | 73-76 |
| C- | 70-72 |
| D+ | 67-69 |
| D | 63-66 |
| D- | 60-62 |
| F | 59 and below |

## Assignment Submission Policy

The Assignments will be posted on Brightspace under the "Assignments" section. Each Assignment will include instructions, a due date, and a link for electronic submission. Assignments must be submitted using this link. Do not email your assignments to the instructor, Learning Assistants, or graders. Turnitin may be utilized for some assignments.

Unless otherwise noted, all Assignment assignments are due the following Friday after they are released, by 11:59:59 PM. The Final will be during the USC Finals period on the day and time specified by the university.

## Course-Specific Policies

It is your responsibility to submit your assignments on or before the due date and verify that they have been successfully submitted. Assignments turned in up to 24 hours late will have 25% of the total points deducted from the graded score. Assignments turned in between 24 and 48 hours late will have 50% of the total points deducted from the graded score. After two days, submissions will not be accepted and you will receive no credit for the assignment.

The Learning Assistants and graders are not authorized to grant an extension on any assignment. Any extensions must be requested of the instructor in writing and confirmed in writing.

## Attendance

You are expected to be in class, on time, and distraction free.

## Academic Integrity

Unless otherwise noted, this course will follow the expectations for academic integrity as stated in the USC Student Handbook. The general USC guidelines on Academic Integrity and Course Content Distribution are provided in the subsequent "Statement on Academic Conduct and Support Systems" section.

For this class, you are expected to submit work that demonstrates your individual mastery of the course concepts. Assignment 7 will require group work and you will be expected to work cooperatively on your presentation delivery.

If found responsible for an academic violation, students may be assigned university outcomes, such as suspension or expulsion from the university, and grade penalties, such as an "F" grade on the assignment, exam, and/or in the course.

Please ask the instructor if you are unsure about what constitutes unauthorized assistance on an exam or assignment, or what information requires citation and/or attribution.

You may not record this class without the express permission of the instructor and all other students in the class. Distribution of any notes, recordings, exams, or other materials from a university class or lectures — other than for individual or class group study — is prohibited without the express permission of the instructor.

***Use of Generative AI in this Course***

**Generative AI is not permitted:** Since creative, analytical, and critical thinking skills are part of the learning outcomes of this course, all assignments should be prepared by the student working individually or in groups as described on each assignment. Students may not have another person or entity complete any portion of the assignment. Developing strong competencies in these areas will prepare you for a competitive workplace. Therefore, using AI-generated tools is prohibited in this course, will be identified as plagiarism, and will be reported to the Office of Academic Integrity.

## Course Schedule

All homework assignments are due the following Friday after they are released, by 11:59 PM
Purple = Graded Assignments Black = Non-graded

| Week | Topics/Daily Activities | Homework Assignments (deliverables) | Reading Before Next Class |
|---|---|---|---|
| **1**<br>**8/26** | **Introduction, Basics of Security**<br>• Types of Security<br>• Goals of Security<br>• Public Breaches & Intrusions<br>• Fundamentals of passwords and passkeys<br>• multi-factor authentication | Case study Review | How the internet works<br>https://www.youtube.com/watch?v=x3c1ih2NJEg<br>Binary numbers and data<br>https://www.youtube.com/watch?v=USCBCmwMCDA&t=264s |
| **2**<br>**9/2** | **Cyber Threats Attacks and Mitigations**<br>• Threat and virus types<br>• Common scams<br>• What is malware, scareware, and spyware | Assignment 1 – computer virus report | Data Centers<br>https://www.youtube.com/watch?v=XZmGGAbHqa0 |
| **3**<br>**9/9** | **Browser protection, Personal device protection and messaging**<br>• Cookies<br>• Browser Extensions<br>• Browser fingerprinting<br>• IOS security settings<br>• Android Security settings<br>• Secure personal messaging | Assignment 2 - Web browser hardening guide | |
| **4**<br>**9/16** | **Computer Hardware**<br>• Physical Pieces of a Computer OS Components<br>• Overview of Operating Systems: Windows, macOS, and Linux | | Computer Basics: Understanding Operating Systems (gcfglobal.org)<br><br>Computer Basics: Inside a Computer (gcfglobal.org)<br>How Hard drives work<br>https://www.youtube.com/watch?v=NtPc0jI21i0<br>How RAM (Read Only Memory) works<br>https://www.youtube.com/watch?v=p3q5zWCw8J4<br><br>**Update your Résumé**<br>https://nationalcareers.service.gov.uk/careers-advice/interview-advice/the-star-method<br><br>https://www.prospects.ac.uk/careers-advice/cvs-and-cover-letters/how-to-write-a-cv |
| **5**<br>**9/23** | **Social Engineering**<br>• Principles of Social Influence<br>• Tactics & Manipulation<br>• Popular Schemes | Assignment 3 Social Engineering | |
| **6**<br>**9/30** | **How to Protect your personal devices**<br>• End-to-End encryption<br>• Wi-Fi and connected devices<br>• VPN's | Assignment 4 Defending your personal devices | |

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| | • What makes a good password?<br>• Why do we need MFA?<br>• How to bypass MFA<br>• Full Disk Encryption (File Vault & Bitlocker) | | |
| **7**<br>**10/7** | **How the Internet Works**<br>• Basics of Computer Networks: WAN and LAN<br>• ISP's<br>• Domain Registration & DNS | | https://www.youtube.com/watch?v=ZhEf7e4kopM&t=319s<br><br>http://computer.howstuffworks.com/wireless-network.htm/printable<br><br>http://computer.howstuffworks.com/ip-telephony.htm/printable<br><br>http://computer.howstuffworks.com/internet/basics/internet-infrastructure.htm/printable<br><br>http://computer.howstuffworks.com/ethernet.htm/printable<br>https://www.sans.org/reading-room/whitepapers/standards/osi-model-overview-543<br><br>Security Now! – How the internet works<br>https://www.youtube.com/watch?v=7ALMh6I1fAo |
| **8**<br>**10/14** | **MIDTERM** | | |
| **9**<br>**10/21** | **How the Internet Works Part 2**<br>• Data Centers<br>• Routers<br>• IP & MAC Addresses | | |
| **10**<br>**10/28** | **Securing Yourself:**<br>• Phone, Laptop, Tablet, and Personal Security<br>• Password Managers<br>• Personal Biometrics<br>• Understanding Personal data collection and how to limit it | | **Communication**<br>Steve Jobs presentation – the first iphone<br>https://www.youtube.com/watch?v=MnrJzXM7a6o<br><br>Speeches<br>https://www.youtube.com/watch?v=962eYqe--Yc<br><br>https://www.youtube.com/watch?v=w82a1FT5o88<br><br>https://www.youtube.com/watch?v=87cnFmCr9PY |
| **11**<br>**11/4** | **How to use Encryption to keep your data safe**<br>• What is Encryption<br>• Security Tactics & Mechanisms<br>• Encryption Algorithms | | Encryption<br>https://www.youtube.com/watch?v=6-JjHa-qLPk |
| **12**<br>**11/11** | **Securing Your Family**<br>• Home Routers, Firewalls, IoT (internet of things devices)<br>• Updates, Administrative v standard users | Assignment 5 – Actively protecting your personal devices | |
| **13**<br>**11/18** | **Cyber Security in Business Training and Awareness**<br>• Program design and delivery<br>• Measuring competence | Assignment 6 - Security Policy Design and Communication | Secure networks<br>https://msdn.microsoft.com/en-us/library/ff648651.aspx |

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| | • Asset and risk management, Frameworks, Compliance, Policies | | |
| **14 11/25** | **Securing the Future: AI** What does Cyber Security look like in an AI world? Assignment 7 – Keeping you and your family Safe Online | (In class activity) | |
| **15 12/2** | Assignment 7 – Keeping you and your family Safe Online (continued from week 14) | (In class activity) | |
| **Finals** | **See USC exam schedule website** | | |

## Statement on Academic Conduct and Support Systems

**Academic Integrity:**
The University of Southern California is a learning community committed to developing successful scholars and researchers dedicated to the pursuit of knowledge and the dissemination of ideas. Academic misconduct, which includes any act of dishonesty in the production or submission of academic work, comprises the integrity of the person who commits the act and can impugn the perceived integrity of the entire university community. It stands in opposition to the university's mission to research, educate, and contribute productively to our community and the world.

All students are expected to submit assignments that represent their own original work, and that have been prepared specifically for the course or section for which they have been submitted. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s).

Other violations of academic integrity include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), collusion, knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university. All incidences of academic misconduct will be reported to the Office of Academic Integrity and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity see the student handbook or the Office of Academic Integrity's website, and university policies on Research and Scholarship Misconduct.

Please ask your instructor if you are unsure what constitutes unauthorized assistance on an exam or assignment, or what information requires citation and/or attribution.

**Course Content Distribution and Synchronous Session Recordings Policies**
USC has policies that prohibit recording and distribution of any synchronous and asynchronous course content outside of the learning environment.

Recording a university class without the express permission of the instructor and announcement to the class, or unless conducted pursuant to an Office of Student Accessibility Services (OSAS) accommodation. Recording can inhibit free discussion in the future, and thus infringe on the academic freedom of other students as well as the instructor. (Living our Unifying Values: The USC Student Handbook, page 13).

Distribution or use of notes, recordings, exams, or other intellectual property, based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study. This includes but is not limited to providing materials for distribution by services publishing course materials. This restriction on unauthorized use also applies to all information, which had been distributed to students or in any way had been displayed for use in relationship to the class, whether obtained in class, via email, on the internet, or via any other media. (Living our Unifying Values: The USC Student Handbook, page 13).

**Students and Disability Accommodations:**
USC welcomes students with disabilities into all of the University's educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

**Support Systems:**

*Counseling and Mental Health - (213) 740-9355 – 24/7 on call*
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

*988 Suicide and Crisis Lifeline - 988 for both calls and text messages – 24/7 on call*
The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline is comprised of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

*Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-9355(WELL) – 24/7 on call*
Free and confidential therapy services, workshops, and training for situations related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking).

*Office for Equity, Equal Opportunity, and Title IX (EEO-TIX) - (213) 740-5086*
Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

*Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298*
Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

*The Office of Student Accessibility Services (OSAS) - (213) 740-0776*
OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

*USC Campus Support and Intervention - (213) 740-0411*
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

*Diversity, Equity and Inclusion - (213) 740-2101*
Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

*USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call*
Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

*USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-1200 – 24/7 on call*
Non-emergency assistance or information.

*Office of the Ombuds - (213) 821-9556 (UPC) / (323-442-0382 (HSC)*
A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

*Occupational Therapy Faculty Practice - (323) 442-2850 or otfp@med.usc.edu*
Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.