

USC Viterbi

School of Engineering
*Information
Technology Program*

ITP 457: Network Security

Units: 4

Spring 2021

Day/Time: Mondays & Wednesdays 4:00-5:50pm

Class Location: Online

Instructor: Grant Derderian

Email: gderderian@provost.usc.edu (all emails should have a response by two business days)

Office: ADM 102

Office Hours: See Blackboard (and always by appointment)

Teaching Assistants: Paige Godvin & David Tupper

Contact Info: See Blackboard

Office: Zoom/Online

Office Hours: See Blackboard

IT Help: Viterbi Information Technology

Hours of Service: Monday-Friday 8AM – 9PM

Contact Info: Phone: 213-740-0517; Email: engrhelp@usc.edu

Program Mission: The goal of the Digital Forensics and Cyber Security program at USC is to develop the critical thinking, analytical reasoning, and technical writing skills that are necessary to effectively work in a junior level digital forensic or cyber security analyst role. This is accomplished through utilizing industry standard tools and techniques to investigate labs and cases based upon real-world investigations and intrusions. Students will study various areas of cyber investigations, including digital evidence gathering, reporting, examinations, and court presentations. Students will study cyber security tenants of risk analysis, remediation, as well as penetration testing and network security design.

Course Description

- This course is an advanced computer security course that focuses on network security, including firewalls, network security policy, intrusion detection, prevention and response, cryptography, and the intersection of network security with other areas of cybersecurity (forensics, web app security, etc.). There will also be additional topics explored including cloud security and modern network security technologies, including zero-trust networks. Guest lecturers relevant to specific topics may also be brought in to the curriculum to enhance the student experience and provide additional industry-specific examples and facilitate discussions.
- This course starts with a familiarization of network design and network protocols. Students will then receive an introduction to network security mechanisms and policies. Students will learn how security infrastructure integrates with the rest of the business and overall IT infrastructure, with hands-on projects, homeworks, and lab assignments. A final project is also a component of the class. News assignments may also be included to help keep student knowledge up-to-date with modern attack landscapes and techniques.
- This is an elective capstone course for the Applied Computer Security Minor and Specialization at USC. As a result, the content covered will draw upon other ITP cybersecurity classes.

Learning Objectives

Upon completing this course, students will:

- Understand in-depth concepts and practical applications of network security
- Learn advanced techniques for securing workstations, servers, and network equipment
- Understand security policy as it specifically related to network security
- Explore emerging network security practices and technologies
- Have a motivation to learn and improve their awareness and understanding of computers and security and apply their knowledge to real-world scenarios

Prerequisite(s): ITP 357 (Enterprise Network Design) or EE/CSCI 450 (Introduction to Computer Networks) or CSCI 353 (Introduction to Internetworking). Instructor approval to waive prerequisites may also be permitted on a case-by-case basis.

Course Notes

This course is letter-graded, with all materials available on Blackboard (blackboard.usc.edu). Labs will be conducted on a student's personal device, sometimes with the cloud environment set up for our class. Communication for this class will be conducted through email and Slack. Students are expected to check both channels for important class announcements and discussions.

Technological Proficiency and Hardware/Software Required

It is assumed that the student has knowledge of enterprise networking as well as common attack and defense methods and tools, through a class such as ITP 325 (preferred) or ITP 375. For any upper-division course (300-level and above), including this one, it is assumed that you have refined your technical abilities in ITP 125, including basic Python scripting.

Required Readings and Supplementary Materials

- All course materials will be posted on Blackboard - <http://blackboard.usc.edu>
- Slack – you will receive an invitation via e-mail.

Description and Assessment of Assignments

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

Grading Breakdown

	% of Grade
Lab Assignments & Homework	30
Class Participation/Attendance	10
Midterm Exam	15
Final Exam	25
Final Project	20
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

Grading Policies

The lab assistants, graders, and instructors will do their best to return assignments graded to students within one week of the submission. Certain assignments that are longer in length, including exams, case reports, and final projects, may require more time.

The grading rubric is posted. There is no curve, and grades are based on performance in the class. While we understand the importance of grades and maintaining a high GPA, we cannot hand out high marks without justified performance in the class. Do not rely upon an expectation of a guaranteed minimum final grade in this class regardless of its impact on your overall GPA, financial situation, familial situation, or the fate of the galaxy.

The instructor is the ultimate authority over any grade for any assignment, exam or class.

University policy states that no extra credit may be afforded to individual students without the same opportunity made available to everyone in the class. Should there be extra credit in the class, it will be made available to the entire class. Do not ask the instructor for additional extra credit.

Grades will be posted on Blackboard and it is your responsibility to ensure that the grades online are accurate and to follow your progress in the class.

Assignment Policies

The labs will be posted on Blackboard under the “Assignments” or “Labs” section. Each lab will include instructions, a due date, and a link for electronic submission. Labs must be submitted using this link. Do not email your assignments to the instructor, lab assistants, or graders. TurnItIn may be utilized for some assignments, and you must make sure that you have fully submitted the assignment (usually a two-step process).

Unless otherwise noted, all lab assignments are due at the beginning of class the next class period one week after the assignment is posted, unless otherwise modified by announcement and/or email from the instructor and/or Lab Assistants. Some assignments (typically longer in length) will have a due date at a later time. Do not expect a timely response from the lab assistants, graders, or instructors if emailed after normal business hours, particularly on the date the assignment is due.

If you join the class after the semester has started, you will have two weeks from the date of enrollment to complete all assignments due before you joined the class unless a written extension is granted from the instructor, typically via email.

It is your responsibility to submit your assignments on or before the due date and verify it has 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 lab 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. If you ask for an extension on the day the assignment is due, without expressing an emergency such as being kidnapped and taken to Mexico, it will probably not be granted.

Certain assignments will require a paper submission, and you may be asked to submit them to the main ITP office. There have been previous allegations of student rudeness to the ITP Staff. If the staff complains about you being rude, you will have 25% automatically deducted from your assignment. Don't be rude.

The instructor and lab assistants reserve the right to not answer certain questions about the lab assignment. This is normally due to the nature of the question being directly related to the learning objectives of the lab. You are encouraged to use online resources to further your understanding of the material to successfully answer questions related to the lab assignment (in other words, use your research skills).

Due to the nature of certain software packages and configurations in the lab, the assignments may or may not work as intended. You are encouraged to ask questions if something appears to not work correctly. However, there are certain instances where things are intended to not work correctly and the instructor and lab assistant will indicate as such. When in doubt, do a little research.

Exam Policies

Please review the schedule of classes for the Final Exam schedule. Should you have a scheduling conflict with the final exam or per University policy you have more than 2 final exams scheduled on the same day, you must contact the instructor and coordinate an alternative time by the end of Week 3. Any requests made after Week 3 are not guaranteed to be accommodated.

Per USC policy, Final Exams must be scheduled during the assigned final examination schedule. It is your responsibility to arrange your travel after the scheduled date of the final exam.

All students are required to participate in the final exam and/or project. Failure to take the final exam and/or submit a final project will result in an automatic failure in the class.

No make-up exams (except for documented medical or family emergencies) will be offered nor will there be any changes made to the Final Exam schedule. Missing your alarm is not an emergency. A documented medical event (car accident with documentation), family emergency (death in the family), or alien abduction can be considered emergencies.

Contacting the Instructor, Lab Assistants or Graders

When emailing the lab assistants, graders or instructor, please be sure to include your full name, class name and number, and class section (day and time) in the email.

Emails sent to the lab assistants or graders will have a response within two business days. The instructor will endeavor to respond to emails within two business days. Do not email anyone with the expectation of an immediate response within the hour. Please do not complain when we have not responded to your email ten minutes before the assignment deadline.

Questions regarding individual clarification or regrade must be made through email to both the lab assistants and the instructor. When requesting a regrade, the instructor has the prerogative to alter a grade higher or lower based upon a review of the entire assignment. Be absolutely certain before requesting a regrade of any assignment or exam – if you are going to roll the dice, be certain of your gamble.

Questions about lab assignments should be submitted through the class discussion board (Slack) or via email. This will have a faster response rate. Do not post code or answers on Slack.

You may request a meeting with the instructor outside of normal office hours. Should you go to the instructor's office outside of normal office hours or outside of a scheduled meeting, do not expect the instructor to be able to meet with you. We do have other responsibilities outside of the class.

Attendance Policy

You are expected to be in class, on time, and distraction free. Any student who misses more than four classes is in danger of failing the course. Please see the instructor immediately if you have missed at least three class meetings.

This is a lab-based class. Certain class sections will be lecture, lab, or a combination of lecture and lab. Attendance is vital to success in the class, and punctuality is vital to success in your professional careers. The lab assistants will be taking attendance for every class meeting. If you anticipate missing a class due to an event, please email the lab assistants and instructor prior to the start of class. If you are sick, we want you to get better and not infect your fellow classmates – please email the lab assistants and instructor. Should you miss a class with a lab assignment, contact the lab assistants to determine available times to come to the lab and finish your assignment.

Writing Skills

A significant portion of the cyber security and digital forensics curriculum involves communicating by writing professional quality reports. These reports are held to standards that are expected by professionals in industry who are writing reports for clients, attorneys, judges, juries, congresspeople, senators, POTUS, etc.

It is expected that the reports will be written with correct spelling, grammar and language nuances of the American English language. A component of each report grade will be based on writing style, grammar and word choice. These reports must be accessible to technical and non-technical readers alike. While you will not be writing comprehensive reports in 125 (unless you choose to do so), please take care to properly communicate your lab and assignment findings.

If you are not a native English speaker and writer, it is recommended that you visit the USC American Language Institute (<http://ali.usc.edu/>) for resources to assist you in this course and your professional careers. Writing assistance is also available from the Dornsife Writing Center (<https://dornsife.usc.edu/writingcenter/>). You do not need to be a Dornsife student to take advantage of the services from the Writing Center. Additional writing assistance is also available from the Viterbi Writing Center in the form of Writing Consultations (<http://viterbi.usc.edu/students/undergrad/varc/writing-consultations.htm>). In accordance with University standards, plagiarism of any type will not be tolerated.

News Assignment

To promote class discussion, each student may be required to submit an article for class discussion starting after a few weeks of class. Articles shall be posted with a hyperlink to the article and a one-paragraph summary to the class Slack news discussion channel for the appropriate week.

News stories should directly pertain to topics covered in this class.

- Post a link to the proper week on the Slack news channel at least one hour before class.
- Please submit a story that is no more than one week old.
- Please take care not to duplicate stories that have been submitted that week.
- If the story is behind a pay-wall or subscription-wall or requires a login, please submit a PDF copy along with the link.
- Be prepared to give a short two-minute summary of the article and any surrounding background details to start the discussion.
- Press releases including anything from prweb.com are not valid news content
- Make you you validate the veracity of your news story
 - o Example: Content from TheHackerNews is frequently inaccurate
- Groups will be posted to Blackboard once enrollment has settled.
- Each proper posting is worth 3 points which is 12 points of your lab assignments grade
- If you are in need of news sources, please visit <http://feedly.com/pclair>

Additional University policies follow the course schedule.

ITP 457 - Course Schedule

This schedule is subject to change throughout the semester.
Lecture, lab, project, and homework content for each week will be posted to Blackboard.

Week of	Monday	Wednesday
1/18	No Class – School Holiday	Welcome
1/25	Networking Review Pt. 1	Networking Review Pt. 2
2/1	Networking Review Pt. 3	Networking Review Pt. 4
2/8	Firewalls Pt. 1	Firewalls Pt. 2/Guest Lecture
2/15	No Class – School Holiday	Windows OS Security Pt. 1
2/22	Windows OS Security Pt. 2	Active Directory
3/1	Group Policy	Other OS Security Techniques
3/8	Backups & Disaster Recovery	MT Review
3/15	Midterm	SEIMs & Network Logging
3/22	Intrusion Detection	VPNs & Zero Trust Networks
3/29	Cloud Security Pt. 1	Cloud Security Pt. 2
4/5	IT Governance, Privacy & Security Laws	No Class – Wellness Day
4/12	Data Loss Prevention Technologies	IAM Pt. 1
4/19	IAM Pt. 2/Guest Lecture	No Class – Wellness Day
4/26	Final Exam Review	Final Project Work Time

Final Exam

According to Final Exam Schedule found at classes.usc.edu.

Statement on Academic Conduct and Support Systems

Academic Conduct:

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences that can include expulsion. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Part B, Section 11, “Behavior Violating University Standards” policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

Support Systems:

Student Counseling Services (SCS) – (213) 740-7711 – 24/7 on call

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention. engemannshc.usc.edu/counseling

National Suicide Prevention Lifeline – 1 (800) 273-8255

Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week. www.suicidepreventionlifeline.org

Relationship and Sexual Violence Prevention Services (RSVP) – (213) 740-4900 – 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender-based harm. engemannshc.usc.edu/rsvp

Sexual Assault Resource Center

For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website: sarc.usc.edu

Office of Equity and Diversity (OED)/Title IX Compliance – (213) 740-5086

Works with faculty, staff, visitors, applicants, and students around issues of protected class. equity.usc.edu

Bias Assessment Response and Support

Incidents of bias, hate crimes and microaggressions need to be reported allowing for appropriate investigation and response. studentaffairs.usc.edu/bias-assessment-response-support

The Office of Disability Services and Programs

Provides certification for students with disabilities and helps arrange relevant accommodations. dsp.usc.edu

Student Support and Advocacy – (213) 821-4710

Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic. studentaffairs.usc.edu/ssa

Diversity at USC

Information on events, programs and training, the Diversity Task Force (including representatives for each school), chronology, participation, and various resources for students. diversity.usc.edu

USC Emergency Information

Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible. emergency.usc.edu

USC Department of Public Safety – UPC: (213) 740-4321 – HSC: (323) 442-1000 – 24-hour emergency or to report a crime.

Provides overall safety to USC community. dps.usc.edu