Introduction to Ethical Hacking
Fall 2020

Instructor

William Bailey
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Office Hours: via *Zoom Meeting* by appointment
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Class Format: *Online*

Class Meetings: *Monday, 17:30 – 20:00*

Where: *Zoom Meeting* (Linked to Canvas)

- Dates: 8/24, *8/31, 9.14, ,9/21, 9/28, 10/5, 10/12, 10/19, 10/26, 11/2, 11/9, 11/16, 11/30, 12/7*

Website: https://community.mis.temple.edu/mis5211sec701fall2020/

Course Description

This course introduces students to the hacking strategies and tactics used by ethical or "White Hat" hackers. Methods of vulnerability exploitation to be used primarily in the process of Security Penetration will be explored in theory and in hands on exercises. The course will require simple programming using Open Source scripting languages and hacking tool kits. For that reason some knowledge of and experience with computer programming is required.

Course Objectives

In this course you will gain an understanding the process and tools used in Ethical Hacking and Penetration Testing.
The Key subject areas that are covered in the course are:

1. How to structure a Penetration Test
2. Open Source tools used in Ethical Hacking and Penetration Testing
3. Commercial alternatives to Open Source tools

The first half of the course, leading up to the mid-term exam, will focus on processes used to discover the structure and possible vulnerabilities in a target environment. The second half of the class will cover the techniques and tools used to exploit weaknesses uncovered during the discovery phase.

Credit Hours: 3

Required Reading & Materials

	Readings
2	https://www.geeksforgeeks.org/basics-computer-networking/ https://www.geeksforgeeks.org/introduction-to-basic-networking-terminology/ https://www.geeksforgeeks.org/tcp-ip-model/ https://www.geeksforgeeks.org/layers-of-osi-model/
3	https://www.sans.org/reading-room/whitepapers/bestprac/open-source-reconnaissance-tools-business-partner-vulnerability-assessment-34490
4	http://www.sans.org/reading-room/whitepapers/auditing/proactive-vulnerability-assessments-nessus-78
5	http://www.sans.org/reading-room/whitepapers/tools/netcat-tcp-ip-swiss-army-knife-952
6	http://www.offensive-security.com/metasploit-unleashed/Main_Page Review Fundamentals, Information Gathering, and Vulnerability Scanning Read Exploit Development, Web App Exploit Development, Client Side Attacks and Auxiliary Module Reference
7	http://www.sans.org/reading-room/whitepapers/engineering/social-engineering-means-violate-computer-system-529
8	https://searchsecurity.techtarget.com/definition/malware https://en.wikipedia.org/wiki/Malware
9	https://www.owasp.org/index.php/Category:OWASP_Top_Ten_Project
10	http://cdn.ttgtmedia.com/rms/pdf/SearchSecurity.in_Burp_%20Suite_tutorial_Part_01.pdf http://cdn.ttgtmedia.com/rms/pdf/SearchSecurity.in_Burp_%20Suite_tutorial_Part_02.pdf http://cdn.ttgtmedia.com/rms/pdf/SearchSecurity.in_Burp_%20Suite_tutorial_Part_03.pdf We will only use the functionality discussed in the first paper. http://www.sans.org/reading-room/whitepapers/application/web-application-injection-vulnerabilities-web-app-039-s-security-nemesis-34247 The last papers also contain information applicable to the following week.
11	No reading Assignment
12	http://www.sans.org/reading-room/whitepapers/securecode/xml-web-services-security-web-based-application-security-1201
13 14	No Reading Assignment

Schedule of Topics, Readings, Assignments with Due dates

Course Schedule*

**Subject to change at the discretion of the Professors*

Week	Topic	Assignments
1	Overview of Course, Philosophy of Ethical Hacking and Penetration Testing, and the hacking process.	
2	TCP/IP and Network Architecture and its impact on the process of hacking. Google Hacking	Quiz
3	Reconnaissance – Concepts of reconnaissance used to obtain basic, high level information about a target organization, often considered information leakage, including but not limited to technical and non-technical public contacts, IP address ranges, document formats, and supported systems.	Quiz Reconnaissance exercise using only publicly available information, develop a profile of a public company or organization of your choosing.
4	Network Mapping and Vulnerability scanning	Quiz Scanning exercise targeted against only systems you personally own, develop a profile of the targeted machine or machines.
5	Introduction to Metasploit	Quiz
6	Continued Metasploit	Quiz
7	Social Engineering, Encoding, and Encryption and the Social Engineering Toolkit	Exam
8	Malware including Trojans, Backdoors, Zero-days, Virus, Worms, and Polymorphic malware	Quiz Analysis Report: Learnings from Metasploit run against a publicly available VM the student chooses

9	Web application hacking, OWASP Top 10, Intercepting Proxies, and URL Editing	Quiz Intercepting Proxy exercise targeted against a public website of your choice. Only normal website activity is to be profiled. **Under no circumstances shall injection techniques be used.**
10	Introduction to SecurityShepherd	Quiz
11	Intro to Dark Web Intro to Cloud	Quiz
12	Introduction to Wireless Security with WEP and WPA2 PSK	Quiz
13	WPA2 Enterprise and Beyond WiFi	Quiz
14	Jack the Ripper, Cain and Able, and Ettercap	Exam

Assignments

See Project Section

Participation

Much of your learning will occur as you prepare for and participate in discussions about the course material. The assignments, analysis, and readings have been carefully chosen to bring the real world into class discussion while also illustrating fundamental concepts.
To encourage participation, 20% of the course grade is earned by preparing before class and discussing the topics between and in class. Evaluation is based on you consistently demonstrating your engagement with the material. Assessment is based on what you contribute, not simply what you know.

1. Preparation before class – To facilitate active participation in the class I request that you be prepared with the following before noon on the day of the class:

   Briefly address and summarize:
   a. One key point you took from each assigned reading. (One or two sentences per reading)
   b. One question that you would ask your fellow classmates that facilitates discussion.
2. Each week there will be one or more Discussion Question(s) that each student will provide an initial response to by noon on the day of class.
3. I will also require that you identify, and are prepared to discuss, an article about a current event in the Ethical Hacking and Penetration Testing arena each week. Each student is expected to contribute a link to an article to the online class discussion each week. An ideal article would be tied thematically to the topic of the week, however, any article you find interesting and would like to share is welcome. The deadline for posting is noon on the day of class.
4. Participation during class – We will typically start each session with "opening" questions about the assigned readings and analyses. I may ask for volunteers, or I may call on you. Students called on to answer should be able to summarize the key issues, opportunities, and challenges in the analyses. All students should be prepared to answer these questions.

   Another important aspect of in-class participation is completion of in-class assignments and contribution to any break out activities.

5. Participation between classes – To facilitate ongoing learning of the course material, we will also discuss course material on the class blog between clasess.

You will post analyses to the Canvas course site.
The criteria for participation includes attendance, punctuality, level of preparation, professionalism, answering questions, discussing readings, discussing case studies, contributing to group activities, and contributing to a positive learning environment. Recognizing that students sometimes have unavoidable conflicts, the baseline for expected participation is assessed on one less week than the number of assigned weekly write-ups.

Project

You will prepare three analyses reports that are assigned during the semester. Do not prepare a separate cover page, instead put your name, the class section number (MIS5211.701), and the analysis in the top-left corner of the header.
To submit your analysis, you must upload to Canvas (under Assignments) no later than **Sunday at 11:59 PM** of the day before class it is due for presentation..
Late submissions for this deadline may result in no credit earned for this assignment.
There is no one particular style for a good analysis. But, there are some common elements to excellent submissions (additional, grade-specific criteria are provided at the end of this syllabus):
• The opening of the analysis makes it immediately clear which assignment and what question is being addressed.
• You have cited specific details regarding key facts and issues of the case. Instead of general observations about information technology or organizations that apply to any problem, draw details from the assignment itself. Analyses, observations, and suggestions should be tied directly to those key facts and issues. You can also draw on the other readings in the course to inform and support your arguments.
• After analyzing the details of the analysis, discuss how its specific issues have broader application. In other words, use your analysis to provide some advice to managerial decision-makers that can be applied to other situations beyond this case.
• Provide a balanced perspective. For example, when making a recommendation explain the pros and cons, providing both the rationale (the why) as well as its feasibility (the how). Well-considered recommendations include discussion of potential issues with your solution and conditions that should be in place for your recommendation to be successful.

Exams

We will have 2 multiple choice question exams. The first one will cover the Introduction to Ethical Hacking materials that we will address in the first 5 weeks of the semester. It represents 20% of your final grade. The second exam will be comprehensive. Anything that we cover during the semester could appear on the final. The second exam is weighted 20% of your final grade.

Quizzes

Quizzes will be assigned periodically during the course. These will be made available during the week, and due by 11:59 PM on the day before our next class.

Weekly Cycle

As outlined above in the **Assignments and Participation** sections, much of your learning will occur as you prepare for and participate in discussions about course content. To facilitate learning course material, we will discuss course material on the class blog in between classes. Each week this discussion will follow this cycle:

When	Actor	Task	Type
Friday	Instructor	Post reading questions on Community web site	
Sunday 11:59 pm	Student	Complete Quiz for prior week (if applicable)	Assignment
Sunday 11:59 pm	Student	Post Analyses Report(s) (when due) on Canvas	Assignment
Monday by 11:59 am	Student	Post initial Discussion Question responses	Participation
Monday	ALL	Class meeting via Zoom	Participation
Monday – Friday (during the week)	Student	Post replies to other students' DQ responses	Participation

Evaluation and Grading

Item	Weight
Analyses Reports	30% (10% per report)
Discussion Questions & Participation	20%
Quizzes	10%
Exam 1	20%
Exam 2	20%
	100%

Grading Scale			
94 – 100	A	73 – 76	C
90 – 93	A-	70 – 72	C-
87 – 89	B+	67 – 69	D+
83 – 86	B	63 – 66	D
80 – 82	B-	60 – 62	D-
77 – 79	C+	Below 60	F

Grading Criteria

The following criteria are used for evaluating assignments. You can roughly translate a letter grade as the midpoint in the scale (for example, an A- equates to a 92).

Criteria	Grade
The assignment consistently meets and exceeds expectations. It demonstrates originality of thought and creativity. Beyond completing all of the required elements, new concepts and ideas are detailed that transcend general discussions along similar topic areas. There are no mechanical, grammatical, or organization issues that detract from the ideas.	A- or A
The assignment meets expectations. It contains information prescribed for the assignment and demonstrates understanding of the subject matter. There may be some omissions or procedural issues, such as grammar or organizational challenges, but these do not significantly detract from the intended assignment goals.	B or B+
The assignment fails to consistently meet expectations. That is, the assignment is complete but contains significant problems that detract from the intended goals. These issues may be relating to content detail, be grammatical, or be a general lack of clarity. Other problems might include not fully following assignment directions.	B-
The assignment constantly fails to meet expectations. It is incomplete or in some other way consistently fails to demonstrate a firm grasp of the assigned material.	Below B-

Late Assignment Policy

An assignment is considered late if it is turned in after the assignment deadlines stated above. No late assignments will be accepted without penalty unless arrangements for validated unusual or unforeseen situations have been made.

- The exercise assignments will be assessed **a 50% penalty** if they are late. No credit is given for late participation assignments including required posts of comments and In the News articles.
- You must submit all assignments, even if no credit is given. **If you skip an assignment, an additional 10 points will be subtracted from your final grade in the course.**
- Plan ahead and backup your work. ***Equipment failure is not an acceptable reason for turning in an assignment late.***

University Policies

TEMPLE AND COVID-19

Temple University's motto is *Perseverance Conquers*, and we will meet the challenges of the COVID pandemic with flexibility and resilience. The university has made plans for multiple eventualities. Working together as a community to deliver a meaningful learning experience is a responsibility we all share: we're in this together so we can be together.

Attendance Protocol and Your Health

Instructors are required to ensure that attendance is recorded for each in-person or synchronous class session. The primary reason for documentation of attendance is to facilitate contact tracing, so that if a student or instructor with whom you have had close contact tests positive for COVID-19, the university can contact you. Recording of attendance will also provide an opportunity for outreach from student services and/or academic support units to support students should they become ill. Faculty and students agree to act in good faith and work with mutual flexibility. The expectation is that students will be honest in representing class attendance.

Video Recording and Sharing Policy

Any recordings permitted in this class can only be used for the student's personal educational use. Students are not permitted to copy, publish, or redistribute audio or video recordings of any portion of the class session to individuals who are not students in the course or academic program without the express permission of the faculty member and of any students who are recorded. Distribution without permission may be a violation of educational privacy law, known as FERPA as well as certain copyright laws. Any recordings made by the instructor or university of this course are the property of Temple University. Any unauthorized redistribution of video content is subject to review by the Dean's office, and the University Disciplinary Committee. Penalties can include receiving an F in the course and possible expulsion from the university. This includes but is not limited to: assignment video submissions, faculty recorded lectures or reviews, class meetings (live or recorded), breakout session meetings, and more.

Code of Conduct Statement for Online Classes Online Behavior

Students are expected to be respectful of one another and the instructor in online discussions. The goal is to foster a safe learning environment where students feel comfortable in discussing concepts and in applying them in class. If for any reason your behavior is viewed as disruptive to the class, you will be asked to leave and you will be

marked absent from that class. Please read the university policy concerning disruptive behavior:

> ***The disruptive student is one who persistently makes inordinate demands for time and attention from faculty and staff, habitually interferes with the learning environment by disruptive verbal or behavioral expressions, verbally threatens or abuses college personnel, willfully damages college property, misuses drugs or alcohol on college premises, or physically threatens or assaults others. The result is the disruption of academic, administrative, social, or recreational activities on campus.***

Online Classroom Etiquette

The expectation is that students attending online courses will behave in the same manner as if they were in a live classroom. Be courteous and professional in your location, attire and behavior. Specifically, your location should reflect a clean and professional appearance - not a bedroom, crowded conference room, loud restaurant/bar, etc. Your attire should mirror what you might wear to a live classroom. We expect that students will not disrupt class through visuals or verbal outbursts, such as but not limited to, conversations with other people in the room, engaging in inappropriate behavior while you are in class or distracting the class in any other way. In addition, students should refrain from doing something in their online class that they would not do in a live classroom. which includes eating large meals, drinking alcohol, vaping, getting up often and leaving the online class (not staying at their computer). You should arrive on time and leave when the class is over. If there is an emergency of some kind, notify your faculty member via email or the chat function in Zoom.

Online exam proctoring

Proctorio or a similar proctoring tool may be used to proctor exams or quizzes in this course. These tools verify your identity and record online actions and surroundings. It is your responsibility to have the necessary government or school issued ID, a laptop or desktop computer with a reliable internet connection, the Google Chrome and Proctorio extension, a webcam/built-in camera and microphone, and system requirements for using Proctorio or a similar proctoring tool. Before the exam begins, the proctor may require a scan of the room in which you are taking the exam.

Student and Faculty Academic Rights & Responsibilities

Freedom to teach and freedom to learn are inseparable facets of academic freedom. The University has a policy on Student and Faculty Academic Rights and Responsibilities (Policy #03.70.02) which can be accessed at policies.temple.edu.

Inclement Weather Policy

Please be advised that while Temple University campuses may close for inclement weather, online courses are not on-campus and therefore are still expected to meet. Your instructor will contact you regarding any adjustments needed in the event of a power outage or severe circumstances. Should you have any questions, please contact the professor.

Academic Honesty

Learning is both an individual and a cooperative undertaking. Asking for and giving help freely in all *appropriate* setting helps you to learn. **You should represent only your own**

work as your own. *Personal integrity* is the basis for intellectual and academic integrity. Academic integrity is the basis for academic freedom and the University's position of influence and trust in our society. University and school rules and standards define and prohibit "academic misconduct" by all members of the academic community including students. You are asked and expected to be familiar with these standards and to abide by them. A link to Temple's Policy on Academic Dishonesty can be found at the following link: https://grad.temple.edu/resources/policies-procedures

Disability Statement

Any student who has a need for accommodations based on the impact of a documented disability or medical condition should contact Disability Resources and Services (DRS) in 100 Ritter Annex (drs@temple.edu; 215-204-1280) to request accommodations and learn more about the resources available to you. If you have a DRS accommodation letter to share with me, or you would like to discuss your accommodations, please contact me as soon as practical. I will work with you and with DRS to coordinate reasonable accommodations for all students with documented disabilities. All discussions related to your accommodations will be confidential.

Temple University's Technology Usage Policy

This site includes information on unauthorized access, disclosure of passwords, and sharing of accounts. https://secretary.temple.edu/sites/secretary/files/policies/04.71.11.pdf