

Syllabus for CMSC388U: Introduction to Ethical Hacking (HackTheClass)

Course Description

This practical, hands-on 1-credit course provides students with an introduction to ethical hacking. The course begins with a discussion on the ethics behind security research and progresses to topics that surround penetration testing, forensics, cryptography, and binary reverse engineering and exploitation. This course is also meant to introduce students to Capture-the-Flag (CTF) style cybersecurity challenges, encourages participation in the Cybersecurity Club at UMD (CSEC@UMD), and prepares for CMSC414.

Course Details

- **Course:** CMSC388U
- **Prerequisites:** C- or better in CMSC216 and CMSC250
- **Credits:** 1
- **Seats:** 30, 1 section
- **Lecture Time:** Fridays, 1:00 - 1:50pm ET
- **Office Hours:** (Tentative) Thursdays, 4:00 - 5:00pm ET
- **Location:** ONLINE
- **Semester:** Spring 2021
- **Textbook:** None
- **Course Facilitators:** John (Vanya) Gorbachev, Alden Schmidt
- **Faculty Advisor:** Dave Levin
- **Syllabus Last Updated:** 1/23/21
- **Previous Offering:** Fall 2019

Topics Covered

- **Security research ethics**
 - Cyberlaw
 - Responsible disclosure
 - Expectation of privacy
- **Linux**
 - Command line
 - Configuring an environment
 - Virtual machines
- **Target reconnaissance**
 - OSINT
 - Social engineering
 - OPSEC
- **Web**
 - Javascript deobfuscation
 - SQL injection
 - XSS
- **Capture the Flag (CTF)**
 - Jeopardy vs Attack-Defense
 - Write-ups
- **Binaries**
 - Reverse engineering
 - [Stack or Heap] buffer overflow
- **Forensics**
 - File types and carving
 - Imaging and Metadata
 - File system artifacts
 - Network packet captures
 - Steganography
- **Penetration testing**
 - Vulnerability scanning
 - Using automated tools
 - Maintaining persistence
- **Cryptography**
 - Classic ciphers
 - Symmetric and asymmetric key
 - Hash-length extension attacks
 - Password cracking

Grading

Assignments should be submitted through ELMS

Grades will be released through ELMS.

You are responsible for all material discussed in lecture and posted on the class repository, including announcements, deadlines, policies, etc.

Your final course grade will be determined according to the following percentages:

# Percentage	Aa Title	≡ Description
50%	<u>Write-ups</u>	Weekly individual write-ups (250-500 words) that summarize and explain your solutions to the assigned CTF challenges or concepts covered in lecture.
25%	<u>Midterm</u>	Examination covering all material up to Lecture 6
25%	<u>Final Hack</u>	Demonstrate mastery of all topics learned and apply knowledge to change your grade on the class's private grade server. The grade earned will be determined by levels unlocked in the grade server and will be applied to your official final grade.

Any request for reconsideration of any grading on coursework must be submitted within 36 hours of when it is returned. No requests will be considered afterwards.

Course Content

Lectures: Will be **synchronous** during the scheduled class time. The Zoom link can be found on ELMS and Piazza.

Homeworks: Will be posted after class on Friday, and will be due before lecture the following week. There is no late submission period so any assignments turned in after class will not be accepted.

Schedule

Aa Week	Topic	Assignment
<u>1</u> <u>(1/29)</u>	Introduction + Ethics 1	Writeup 1, Download VMWare/Virtualbox, Kali, <u>OSINT Handbook</u>
<u>2</u> <u>(2/5)</u>	Ethics 2 + OSINT 1	Writeup 2, <u>Kali VM install instructions</u>
<u>3</u> <u>(2/12)</u>	OSINT II + Vulnerability scanning	Writeup 3
<u>4</u> <u>(2/19)</u>	Penetration testing I	Writeup 4
<u>5</u> <u>(2/26)</u>	Binaries I	Writeup 5
<u>6</u> <u>(3/5)</u>	Forensics I	Writeup 6
<u>7</u> <u>(3/12)</u>	Midterm	
<u>8</u> <u>(3/19)</u>	Spring Break	
<u>9</u> <u>(3/26)</u>	Binaries II	Writeup 7
<u>10</u> <u>(4/2)</u>	Forensics II	Writeup 8
<u>11</u> <u>(4/9)</u>	Cryptography I	Writeup 9
<u>12</u> <u>(4/16)</u>	Web I	Writeup 10
<u>13</u> <u>(4/23)</u>	Web II	Writeup 11
<u>14</u> <u>(4/30)</u>	Final Review	Writeup 12
<u>15</u> <u>(5/7)</u>	Wrap-up	Final hack.

The timeline is not final and can be subject to change.

Communicating with course staff

There will be office hours for this course at (tentatively) 4-5PM ET, Thursdays.

Meetings can be scheduled via ELMS messaging.

There is a Piazza page for this class which can be used for questions and course related communication.

Email/other communications should only be used for emergencies and not class related questions.

Instructor:

Dr. Dave Levin - dml@cs.umd.edu

TAs:

John (Vanya) Gorbachev

Alden Schmidt

Excused Absence and Academic Accommodations

Please direct all excused absence and extension requests to Dave Levin.

See the section titled [Course Related Policies](#).

Disability Support Accommodations

See the section titled "Accessibility" available at [Course Related Policies](#).

Academic Integrity

Note that academic dishonesty includes not only cheating, fabrication, and plagiarism, but also includes helping other students commit acts of academic dishonesty by allowing them to obtain copies of your work. In short, all submitted work must be your own. Cases of academic dishonesty will be pursued to the fullest extent possible as stipulated by the [Office of Student Conduct](#).

It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit
<http://www.shc.umd.edu>.

Course Evaluations

If you have a suggestion for improving this class, don't hesitate to tell the instructor or TAs during the semester. At the end of the semester, please don't forget to provide your feedback using the campus-wide CourseEvalUM system. Your comments will help make this class better.

Thanks to the writers of this syllabus for the wording of much of this document.