

CMSC389R: 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, cryptology, 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 UMD's Cybersecurity Club ([UMDCSEC](#)), and prepares for CMSC414.

Course Details

- **Course:** [CMSC389R](#)
- **Prerequisites:** C- or better in CMSC216 and CMSC250
- **Credits:** 1
- **Seats:** 60, (30/section)
- **Lecture Time:** Fridays, TBD (0101) and TB (0201)
- **Location:** TBD
- **Semester:** Fall 2019
- **Textbook:** None
- **Course Facilitators:** [Michael Reininger](#) and [Wesley Weidenhamer](#)
- **Faculty Advisor:** [Dave Levin](#)
- **Syllabus Last Updated:** April 1, 2019
- **Previous Offering:** [Spring 2018](#), [Fall 2018](#), [Spring 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
- Penetration testing
 - Vulnerability scanning
 - Using automated tools
 - Maintaining persistence
- Forensics
 - Imaging
 - File types and carving
 - Metadata
 - File system artifacts
 - Network packet captures
 - Steganography
- Binaries
 - Reverse engineering
 - Stack-based buffer overflow
- Web
 - Javascript deobfuscation
 - SQL injection
 - XSS
- Cryptography
 - Classic ciphers
 - Symmetric and asymmetric key
 - Hash-length extension attacks
 - Password cracking
- Capture the Flag (CTF)
 - Jeopardy vs Attack-Defense
 - Write-ups and Proof-of-Concept (PoC)

Grading

Assignments should be submitted through your personal fork of our class repository. Instructions on how to set this up and do it can be found [here](#).

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	Title	Description
55%	Write-ups	Weekly individual write-ups (250-500 words) that summarize and explain your solutions to the assigned CTF challenges or concepts covered in lecture.
20%	Midterm	Examination on topics covered until Forensics II.
25%	Final Hack	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.

Assignments may be submitted up to 3 days late for a 10%/day penalty.

Schedule

Week	Topic	Assignment
1 (8/30)	Introduction + Ethics	Writeup 1 , Download VirtualBox , Kali , Gray Hat Hacking (Ch. 1) , OSINT Handbook
2 (9/6)	OSINT	Writeup 2 , Kali VM installation instructions
3 (9/13)	OPSEC , Vulnerability scanning , Social Engineering	Writeup 3
4 (9/20)	Penetration Testing	Writeup 4
5 (9/27)	Forensics I	Writeup 5
6 (10/4)	Forensics II	Writeup 6
7 (10/11)	Midterm	
9 (10/18)	Binaries I	Writeup 8
10 (10/25)	Binaries II	Writeup 9

Week	Topic	Assignment
10 (11/1)	Cryptography I	Writeup 10
11 (11/8)	Cryptography II	Writeup 11
12 (11/15)	Web I	Writeup 7
13 (11/22)	Web II	Writeup 12
14 (11/29)	Web II	Writeup 12
15 (12/6)	Wrap-up	Final hack.

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

Communicating with course staff

Official announcements will be sent through the course Piazza. Interaction between students and course staff will also occur via Piazza. Email should only be used for emergencies.

Office hours will be provided after class on Friday's from 3-4 PM. Course staff will remain in the classroom to answer questions and provide assistance as needed. Meetings can also be scheduled via Piazza.

Faculty Admin:

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

Instructors:

Michael Reininger - michael@csec.umiacs.umd.edu

Wesley Weidenhamer - wesley@csec.umiacs.umd.edu

Excused Absence and Academic Accommodations

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.