DFOR 780 - Darknet Technologies
2024 Fall

Meeting Dates: August 28 – December 4, 2024
Meeting Times: Wednesdays, 4:30 – 7:10 PM
Meeting Location: Nguyen Engineering Building, Room 5358
Modality: In-person

Instructor: Prof. David Vargas
Contact Info: dvargas7@gmu.edu
Office Hours: As needed (**t**o help students succeed, the instructor can make himself available before class, after class, via email, and/or via phone)

Course Description: This course is an introduction to a misunderstood part of the Internet known as the "Darknet". While often considered a safe-haven for those committing cybercrime, it is also a place where dissidents and other well-meaning individuals can communicate anonymously. Because of how the Darknet is used by cybercriminals and nation-states for malicious purposes, understanding its operation, protocols and architecture is crucial for those working in any security-related field. The beginning of the course will focus on the Darknet itself while the remainder will focus on its underlying technologies.

Course Learning Outcomes: At the conclusion of this course, students will**:**

- Have a complete understanding of the Darknet and how it differs from the Surface Web
- Be able to describe and work with the individual components and protocols that make up the Darknet
- Understand how the Tor Browser anonymizes web surfing on the Darknet
- Know exactly how cybercriminals and nation-states use the Darknet for malicious purposes
- Be able to describe how law enforcement tries to deanonymize criminal activity on the Darknet

Prerequisites: Knowledge of local and wide area networking, IP and security protocols.

Important Notice:

- This course will be hosted on Blackboard for the Fall 2024 semester. Please ensure you are familiar with accessing and navigating this platform.
- Resources and support are available at: https://lms.gmu.edu/getting-started-students/ to help you get started. If you have any questions, do not hesitate to reach out to me or contact the ITS Support Center for assistance.

Midterm and Final Exams: Are closed-book, closed-notes and will cover all topics covered to date. There will be two (2) exams. Exam questions are largely derived from lectures and textbook chapters. Exams and will be administered on Blackboard. Exams cannot be taken after they are administered. To be fair to all students, and to protect the integrity of the exams, exceptions cannot be made.

Quizzes: Because in technical fields, it is important to both know and do, this course will include quizzes that are based on the hands-on labs. Questions are derived from both the labs and the discussions surrounding the labs. Quizzes will be administered on Blackboard and cannot be taken after they are administered. To be fair to all students, and to protect the integrity of the exams, exceptions cannot be made.

Evaluation and Grading:

Assignment	**Weight**
Four (4) Quizzes	55%
Mid-Term Examination	20%
Final Examination	20%
Extra Credit (Weekly .5-Question Quizzes)	5%
Total	**100%**

Honor Code: The Mason Honor Code is in effect http://oai.gmu.edu/honor-code/masons-honor-code/

- Student members of the George Mason University community pledge not to cheat, plagiarize, steal, and/or lie in matters related to academic work.

Course Materials: All reading materials will be available on Mason Blackboard.

- Getting on Blackboard:
  - Go to: https://mymasonportal.gmu.edu/webapps/portal/frameset.jsp
  - Login with your Mason Credentials
- Click on the Courses tab
- Click on the DFOR-780

Online Lectures: In certain situations, we may have class online via Blackboard Collaborate. Students will be contacted by email ahead of time should a class be held online. Online classes will be recorded and saved for later review.

- Accessing Online lectures:
  - Follow instructions to login into Blackboard
  - Click on Tools
  - Click on Blackboard Collaborate Ultra
  - You should see the current session listed

- Previously recorded sessions are accessed via the Previously Recorded Tab

Lab Computers: This course uses GMU lab computers. Please make sure that your computer is working properly prior to the start of class. If your machine is not working, please let the instructor know.

Required Readings and Reference Materials: All materials will be provided by the instructor via Blackboard.

Other Required Materials:

- Removable storage device (for copies of VMs)
- An erasable 8 GB (minimum) USB drive is required for some labs

Student Welcome: This link provides up-to-date information on IT services: http://labs.vse.gmu.edu/uploads/FacultyFAQ/StudentWelcome.pdf

Disability Services: http://itservices.gmu.edu/downloads/index.cfm.

- Students with disabilities who seek accommodations in a course must be registered with the Mason Office of Disability Services (ODS) and inform the instructor, in writing, at the beginning of the semester. See http://www2.gmu.edu/dpt/unilife/ods/ or call 703-993-2474 to access the ODS.

Note:

- ALL STUDENTS MUST HAVE GMU CREDENTIALS (EMAIL ACCOUNT) AND HAVE ACCESS TO https://mymasonportal.gmu.edu !!
- All Email Correspondence Will Take Place From Your GMU Account to dvargas7@gmu.edu!!!
- Students are responsible for all of the material in the course

Schedule:

Wk	Date	Content	Readings, Homework, and Other Assignments	In-Class Labs and Exercises
1	Aug 24, 2024	**Syllabus Review** **Student and Faculty Introductions** **Introduction to the Darknet**	**Supporting Materials** **Homework Podcast:** -Vice Cyber Podcast - "Drugs Cannabis and identity Theft - The Truth Behind the Dark Web" (Uploaded onto BB)	NA
2	Sep 4, 2024	**Cybercrime on the Darknet** **APTs and Cybercrime**	**Supporting Materials** **Homework Reading:** -2022 FBI Internet Crime Report 2022 **Homework Podcasts:** -Dangers of the Dark Web: Murder for Hire -How North Korea rinses the dirty proceeds of its cyber heists **Recommended Podcast:** -The Lazarus Hei$t	**Labs**
3	Sep 11, 2024	**Accessing the Darknet Safely: Virtualization**	**Supporting Materials** **Homework Video:** -Chinese Cybercrime in Neighboring Countries	**Labs**
4	Sep 18, 2024	**Darknet Access Methods**	**Supporting Materials**	**Quiz 1 (Session 1-3 Labs)** **Labs**

5	Sep 25, 2024	**Darknet Access Methods (cont)**	**Supporting Materials**	**Labs**
6	Oct 2, 2024	**Darknet Sites** **The Tor Network**	**Supporting Materials** **Case Studies:** -Silk Road -AlphaBay	**Labs**
7	Oct 9, 2024	**Tor Network Traffic**	**Supporting Materials**	**Quiz 2 (Session 4-6 Labs)** **Labs**
8	Oct 16, 2024	**Midterm Exam (Sessions 1-7)**		**Review:** Midterm Exam
9	Oct 23, 2024	**Underlying Darknet Technologies**	**Supporting Materials** **Homework:** -Send Instructor GPG Encrypted Message	**Labs**
10	Oct 30, 2024	**Underlying Darknet Technologies**	**Supporting Materials**	**Quiz 3 (Session 7-9 Labs)** **Labs**
11	Nov 6, 2024	**Underlying Darknet Technologies**	**Supporting Materials** **Special:** Chainalysis Crypto Crime Report **Homework:** -The Blockchain Bandit: How $54 million in	**Labs**

			Ethereum was Stolen -Srsly Risky Biz: Why 'pig butchering" is even worse than you think -The Cyberlaw Podcast - Episode 438: Tracers in the Dark by Andy Greenberg -The Missing Cryptoqueen Podcast - Onecoin	
12	Nov 13, 2024	**Other Law Enforcement Defeating Technologies**	**Supporting Materials** **Homework:** -Don't Use a VPN...it's not the ultimate security fix you've been told -EFF Privacy Badger EFF Surveillance Self-Defense Guides	**Labs**
13	Nov 20, 2024	**Darknet Investigations** **Other Darknets**	**Supporting Materials** **Homework:** -Audit of the Federal Bureau of Investigation's Strategy and Effort to Disrupt Illegal Dark Web Activities -TOR Forensics - Investigating the Tor Browser for Evidence	**Labs**
	Nov 27, 2024	**No Class – Thanksgiving Holiday**		
15	Dec 4, 2024	**Final Exam (Sessions 9-13)**		**Quiz 4 (Session 10-13 Labs)**

The instructor may alter the contents of this course at any time to customize the topics to the class or to integrate recent developments in the subject matter. Changes will be announced in class and/or on Blackboard as soon as possible.

Mason Calendar: https://registrar.gmu.edu/calendars/fall_2024/