MARYLAND APPLIED
GRADUATE ENGINEERING

ENPM685 – Information Security Tools Syllabus – Spring 2025
Sections 0101 and CY01—3 Credits—January 29th, 2025 – May 7th, 2025

Instructor: Kevin Shivers   **Email:** kts@umd.edu
Pronouns: He/Him/His   **Office Hours:** Monday 11:30am – 1pm or by appointment (Zoom link in ELMS)

When contacting the Instructor please include "ENPM685" in the Subject line.
You must use your umd.edu or terpmail.umd.edu email address, others will be ignored.
Email response time: 1 business day (M-F 9am-5pm)

Course Times and Location:
Section 0101 - Wednesdays 7:00pm - 9:40pm – JMP 3201
Section CY01 - Online
Canvas/ELMS: https://umd.instructure.com/courses/1379581

Course Description

This course is designed to give a broad survey of tools commonly used by IT security professionals. Current operating systems (Windows, Linux), scripting languages (Bash, Python, PowerShell) will be discussed as well as tools that are widely used in the security industry (ex: Wireshark, iptables, Snort, Splunk, Nessus, Metasploit, etc.) Topics include incident response and investigation, enterprise log management and correlation, vulnerability assessment and penetration testing, host and network-based defense in depth tools. Students taking this course do not need to have any previous programming experience but will find familiarity with the fundamental concepts of programming or scripting helpful.

Learning Outcomes

After successfully completing this course, you will be able to:

- Understand how and when to use widely used offensive security tools to perform vulnerability assessment, penetration testing, and adversary emulation.
- Understand how and where to use defensive security tools to protect data and computer networks from threat actors.
- Perform critical incident response steps when alerted to a cybersecurity incident.

Required Technology

This is a hands-on class. Students will need a computer running the operating system of their choice and will need to have a copy of VMWare Workstation or Fusion (available free from https://terpware.umd.edu) for Intel or M-powered devices or Parallels for M-powered devices. Students will create and be provided with virtual machine images that will be used for in class exercises and for assignments. Students you should bring a laptop to class so you can perform the exercises during class.

Course Schedule

Week	Topic and Assignments
1	**Intro / User Awareness / VM Setup / Windows / Linux** ● Build Virtual Machine Assignment issued **Readings:** Asset Management, MSU Ransomware, Operation Cleaver, Troubleshooting Primer, Linux Primer, Network Primer
2	**Cybersecurity Frameworks and Foundational Policies** ● **Homework Assignment (Linux/Networking/Troubleshooting) Due 2/7/2025 @ 11:59pm**
3	**Anatomy of an Attack** ● **Build Virtual Machine Assignment Due 2/11/2025 @ 11:59pm**
4	**Network Analysis Tools**
5	**Firewalls** ● **Homework Assignment (Network Analysis) Due 2/28/2025 @ 11:59pm**
6	**Intrusion Detection**
7	**Incident Response and Investigation Tools** ● Group Project issued ● **Homework Assignment (Intrusion Detection) Due 3/14/2025 @ 11:59pm**
8	**SPRING BREAK – NO CLASS**
9	**Incident Response and Investigation Tools**
10	**Incident Response and Investigation Tools** ● **Group Project due – 4/4/2025 @ 11:59pm** ● **Homework Assignment (Incident Response 1) Due 4/4/2025 @ 11:59pm** **Readings:** Vulnerability Identification & Risk with CVE & CVSS
11	**Cybersecurity Assessment & Vulnerability Management** ● **Homework Assignment (Incident Response 2) Due 4/11/2025 @ 11:59pm**
12	**Penetration Testing** ● **Homework Assignment (Vulnerability Assessment) Due 4/18/2025 @ 11:59pm**
13	**Penetration Testing** ● **Homework Assignment (Penetration Testing 1) Due 4/25/2025 @ 11:59pm**
14	**Scripting with Python** ● **Homework Assignment (Penetration Testing 2) Due 5/2/2025 @ 11:59pm**
15	**Emerging Technology & Course Wrap Up**
	Solo Project – Friday May 16th @ 11:59pm

Note: This is a tentative schedule, and subject to change as necessary – monitor ELMS-Canvas for current deadlines. In the unlikely event of a prolonged university closing, or an extended absence from the university, adjustments to the course schedule, deadlines, and assignments will be made based on the duration of the closing and the specific dates missed.

Questions/Troubleshooting Matrix

Support Item	Support Contact
Class administrative issues	1. Review the syllabus 2. Review the week 1 slides 3. Contact the professor
Grading concerns	Contact the professor
Technical questions	1. Google 2. Contact the Professor
ELMS/Canvas issues	IT Support- https://itsupport.umd.edu/
Issues with lecture video capture/playback	DETS - dets-support@umd.edu

Grading

Assignment	Points
Homework Quizzes (8 Assignments, top 6 count)	48 (8 points each)
Build Virtual Machine Assignment	10
Group Project (Midterm Project)	12
Solo Project (Final Project)	30
Total	100

Homework Assignments/Quizzes
Homework assignments are to be completed individually and include quizzes or written work. These are based on real-life tasks you will find yourself doing in the professional world and/or based on the exercises we will do in class or outside of class. Completing the exercises will certainly make completing the homework assignments easier.

Solo Project
The solo project simulates a real-life penetration test and is to be completed individually. You will need to find specific "flags" as proof of your successful exploitation of the system and document the process you used to find them.

Group Project
Group work will be completing simulations of real-life examples of tasks such as conducting a tabletop exercise. Groups for group projects will be set by the instructor. Group members are responsible for completing all work and keeping other group members accountable for completing their part of the project. Peer assessment is part of your grade for this assignment.

Questions about Assignments
Please ask all questions you may have about an assignment by 5PM the day before the assignment is due. Any questions asked after that time may not be answered in time for you to make changes to your work.

Grading Assignments
All assignments will be graded according to a predetermined set of criteria (i.e., rubric) which will be communicated to students before the assignment is submitted.

To progress satisfactorily in this class, students need to receive timely feedback. To that end, it is my intention to grade all assignments within 1 week of their due date for smaller assignments and 2 weeks for larger assignments. If an assignment is taking longer than expected to grade, students will be informed of when they can expect to see their grade.

Grade Computation
All assessment scores will be posted in ELMS/Canvas. If you would like to review any of your grades (including the exams), or have questions about how something was scored, please email me to schedule a time for us to meet and discuss.

Final letter grades are assigned based on the percentage of total assessment points earned. To be fair to everyone I must establish clear standards and apply them consistently, so please understand that being close to a cutoff is not the same as making the cut (89.99 ≠ 90.00). It would be unethical to make exceptions for some and not others.

Final Grade Cutoffs

A+ = 100 – 99	**B+** = 89.99 - 89	**C+** = 79.99 - 79	**D+** = 69.99 - 69	**F** = 59.99 - 0
A = 98.99 - 90.01	**B** = 88.99 - 80.01	**C** = 78.99 - 70.01	**D** = 68.99 - 60.01	
A- = 90	**B-** = 80	**C-** = 70	**D-** = 60	

Grade Disputes
I am happy to discuss any of your grades with you, and if I have made a mistake, I will correct it. **All grade disputes must be sent to the instructor via email within 1 week of the grade being posted.** If the instructor elects to review your assignment it will be for an exhaustive re-grade and your score for the assignment may go up or down depending on what the re-grade determines.

Late Work Policy
Assignments should be completed by the due date and time listed in the syllabus, and/or in ELMS/Canvas. If you are unable to complete an assignment by the stated due date, it is your responsibility to contact your instructor via

email to discuss any extenuating circumstances, at least 24 hours BEFORE the assignment is due. Extensions are not guaranteed but may be granted at the instructor's discretion.

Late assignments will have 10% of the points deducted for every day the assignment is late. Assignments submitted over one week late will not be accepted or graded.

- **Extra Credit:** I do not plan to offer extra credit assignments. If I do it will be offered to all students and it will be a significant amount of work for a very small amount of credit.
- **Curve:** There will be no curve for the class. Do the work and you'll be fine.
- **Rounding:** I do not round grades up/down. Do the work and you'll be fine.
- **Assignments must be submitted via ELMS. Assignments submitted outside of ELMS will not be accepted or graded.**
- **Assignments are not completed until they are submitted in ELMS.**
- **The only timestamp that matters is the one in ELMS.**
- **Check that you have submitted the correct assignment after you have uploaded it.**

Communications

Communicating with the Instructor

My goal is to be readily available to you throughout the semester. I can be reached by email at kts@umd.edu. Please DO NOT email me with questions that are easily found in the syllabus or on ELMS-Canvas (e.g., When is this assignment due? How much is it worth? etc.), but please DO reach out about personal, academic, and intellectual concerns/questions.

I will do my best to respond to emails within 1 business day (9-5PM Monday - Friday.) When constructing an email to me please put "ENPM685" in the subject line. This will draw my attention to your email and enable me to respond to you more quickly. Please use your University email address to communicate with me. The use of personal email accounts may be ignored since there is no way to verify the legitimacy of emails coming from personal accounts.

Additionally, please review [These tips for 'How to email a Professor'](). By following these guidelines, you will be ensured to receive a timely and courteous response.

Finally, if you need to discuss issues not appropriate for the classroom and/or an email, we can arrange to talk by phone, over Zoom, or in person. Send me an email asking for a meeting and we can set something up.

Announcements

I will send IMPORTANT messages, announcements, and updates through ELMS-Canvas. To ensure you receive this information in a timely fashion, make sure your email and announcement notifications (including changes in assignments and/or due dates) are enabled in ELMS-Canvas ([How to change notification settings in CANVAS]()).

Log into our ELMs-Canvas course site at least once every 24-hour period to check your inbox and the Announcements page.

Names/Pronouns and Self-Identifications

The University of Maryland recognizes the importance of a diverse student body, and we are committed to fostering inclusive and equitable classroom environments. I invite you, if you wish, to tell us how you want to be referred to in this class, both in terms of your name and your pronouns (he/him, she/her, they/them, etc.). Keep in mind that the pronouns someone uses are not necessarily indicative of their gender identity. Visit trans.umd.edu to learn more.

Additionally, it is your choice whether to disclose how you identify in terms of your gender, race, class, sexuality, religion, and dis/ability, among all aspects of your identity (e.g., should it come up in classroom conversation about our experiences and perspectives) and should be self-identified, not presumed or imposed. I will do my best to address and refer to all students accordingly, and I ask you to do the same for all of your fellow Terps.

Communicating with your Peers

With a diversity of perspectives and experience, we may find ourselves in disagreement and/or debate with one another. As such, it is important that we agree to conduct ourselves in a professional manner and that we work together to foster and preserve a virtual classroom environment in which we can respectfully discuss and deliberate controversial questions. I encourage you to confidently exercise your right to free speech—bearing in mind, of course, that you will be expected to craft and defend arguments that support your position. Keep in mind, that free speech has its limit and this course is NOT the space for hate speech, harassment, and derogatory language. I will make every reasonable attempt to create an atmosphere in which each student feels comfortable voicing their argument without fear of being personally attacked, mocked, demeaned, or devalued.

Any behavior (including harassment, sexual harassment, and racially and/or culturally derogatory language) that threatens this atmosphere will not be tolerated. Please alert me immediately if you feel threatened, dismissed, or silenced at any point during our semester together and/or if your engagement in discussion has been in some way hindered by the learning environment.

Netiquette Policy

Netiquette is the social code of online classes. Students share a responsibility for the course's learning environment. Creating a cohesive online learning community requires learners to support and assist each other. To craft an open and interactive online learning environment, communication must be conducted in a professional and courteous manner at all times, guided by common sense, collegiality and basic rules of etiquette.

General Campus Policies and Services

The instructor reserves all rights to update the syllabus as needed. Notification of changes will be sent and previous versions of the syllabus will be kept in ELMS for student review.

On-campus students are expected to attend in-person class sessions for the section they are enrolled in and be prepared to engage with the lecture and materials. If you have a conflict on a particular day, please reach out to me in advance to discuss.

Please note that F1 students enrolled in the on-campus section are required to attend in person.

Religious Observance
It is the student's responsibility to inform the instructor of any intended absences for religious observances in advance. Notice should be provided as soon as possible but no later than the end of the schedule adjustment period.

Academic Integrity
For this course, some of your assignments will be collected via Turnitin on ELMS/Canvas. I have chosen to use this tool because it can help you improve your scholarly writing and help me verify the integrity of student work. For information about Turnitin, how it works, and the feedback reports you may have access to, visit Turnitin Originality Checker for Students

The University's Code of Academic Integrity is designed to ensure that the principles of academic honesty and integrity are upheld. In accordance with this code, the University of Maryland does not tolerate academic dishonesty. Please ensure that you fully understand this code and its implications because all acts of academic dishonesty will be dealt with in accordance with the provisions of this code. All students are expected to adhere to this Code. It is your responsibility to read it and know what it says, so you can start your professional life on the right path. **As future professionals, your commitment to high ethical standards and honesty begins with your time at the University of Maryland.**

It is important to note that course assistance websites, such as CourseHero, or AI generated content are not permitted sources, unless the instructor explicitly gives permission. Material taken or copied from these sites can be deemed unauthorized material and a violation of academic integrity. These sites offer information that might be inaccurate or biased and most importantly, relying on restricted sources will hamper your learning process, particularly the critical thinking steps necessary for college-level assignments.

Additionally, students may naturally choose to use online forums for course-wide discussions (e.g., Group lists or chats) to discuss concepts in the course. However**, collaboration on graded assignments is strictly prohibited unless otherwise stated**. Examples of prohibited collaboration include: asking classmates for answers on quizzes or exams, asking for access codes to clicker polls, etc. Please visit the **Office of Graduate Studies' full list of campus-wide policies** and reach out if you have questions.

If you ever feel pressured to comply with someone else's academic integrity violation, please reach out to me straight away. Also, *if you are ever unclear* about acceptable levels of collaboration, *please ask*!

Course Evaluation
Please submit a course evaluation through Student Feedback on Course Experiences in order to help faculty and administrators improve teaching and learning at Maryland. All information submitted to Course Experiences is confidential. Campus will notify you when Student Feedback on Course Experiences is open for you to complete your evaluations at the end of the semester. Please go directly to the Student Feedback on Course Experiences to complete your evaluations. By completing all of your evaluations each semester, you will have the privilege of accessing through Testudo the evaluation reports for the thousands of courses for which 70% or more students submitted their evaluations.

Copyright Notice
Course materials are copyrighted and may not be reproduced for anything other than personal use without written permission.

Tips for Succeeding in this Course

1. **Participate.** I invite you to engage deeply, ask questions, and talk about the course content with your classmates. You can learn a great deal from discussing ideas and perspectives with your peers and professor. Participation can also help you articulate your thoughts and develop critical thinking skills.
2. **Manage your time.** Students are often very busy, and I understand that you have obligations outside of this class. However, students do best when they plan adequate time that is devoted to course work. Block your schedule and set aside plenty of time to complete assignments including extra time to handle any technology related problems.
3. **Login regularly.** I recommend that you log in to ELMS-Canvas several times a week to view announcements, discussion posts and replies to your posts. You may need to log in multiple times a day when group submissions are due.
4. **Do not fall behind.** This class moves at a quick pace and each week builds on the previous content. If you feel you are starting to fall behind, check in with the instructor as soon as possible so we can troubleshoot together. It will be hard to keep up with the course content if you fall behind in the pre-work or post-work.
5. **Use ELMS-Canvas notification settings.** Pro tip! Canvas ELMS-Canvas can ensure you receive timely notifications in your email or via text. Be sure to enable announcements to be sent instantly or daily.
6. **Ask for help if needed.** If you need help with ELMS-Canvas or other technology, IT Support. If you are struggling with a course concept, reach out to me and your classmates for support.

Student Resources and Services

Taking personal responsibility for your learning means acknowledging when your performance does not match your goals and doing something about it. I hope you will come talk to me so that I can help you find the right approach to success in this course, and I encourage you to visit the [Counseling Center's Academic Resources](#) to learn more about the wide range of resources available to you. Below are some additional resources and services commonly used by graduate students. For a more comprehensive list, please visit the Graduate School's [Campus Resources Page](#).

Accessibility and Disability Services
The University of Maryland is committed to creating and maintaining a welcoming and inclusive educational, working, and living environment for people of all abilities. The University of Maryland is also committed to the principle that no qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs, or activities of the University, or be subjected to discrimination. The [Accessibility & Disability Service (ADS)](#) provides reasonable accommodations to qualified individuals to provide equal access to services, programs and activities. ADS cannot assist retroactively, so it is generally best to request accommodations several weeks before the semester begins or as soon as a disability becomes known. Any student who needs accommodations should contact me as soon as possible so that I have sufficient time to make arrangements.

For assistance in obtaining an accommodation, contact Accessibility and Disability Service at 301-314-7682, or email them at adsfrontdesk@umd.edu. Information about sharing your accommodations with instructors, note taking assistance and more is available from the Counseling Center.

Writing Center
Everyone can use some help sharpening their communication skills (and improving their grade) by visiting The Graduate School's Writing Center and schedule an appointment with them. Additionally, international graduate students may want to take advantage of the Graduate School's free English Editing for International Graduate Students (EEIGS) program.

Health Services
The University offers a variety of physical and mental health services to students. If you are feeling ill or need non-emergency medical attention, please visit the University Health Center.

If you feel it would be helpful to have someone to talk to, visit UMD's Counseling Center or one of the many other mental health resources on campus.

Notice of Mandatory Reporting
Notice of mandatory reporting of sexual assault, sexual harassment, interpersonal violence, and stalking: As a faculty member, I am designated as a "Responsible University Employee," and I must report all disclosures of sexual assault, sexual harassment, interpersonal violence, and stalking to UMD's Title IX Coordinator per University Policy on Sexual Harassment and Other Sexual Misconduct.

If you wish to speak with someone confidentially, please contact one of UMD's confidential resources, such as CARE to Stop Violence (located on the Ground Floor of the Health Center) at 301-741-3442 or the Counseling Center (located at the Shoemaker Building) at 301-314-7651.

You may also seek assistance or supportive measures from UMD's Title IX Coordinator, Angela Nastase, by calling 301-405-1142, or emailing titleIXcoordinator@umd.edu.
To view further information on the above, please visit the Office of Civil Rights and Sexual Misconduct's website at ocrsm.umd.edu.

Basic Needs Security
If you have difficulty affording groceries or accessing sufficient food to eat every day, or lack a safe and stable place to live, please visit UMD's Division of Student Affairs website for information about resources the campus offers you and let me know if I can help in any way.

Veteran Resources
UMD provides some additional supports to our student veterans. You can access those resources at the office of Veteran Student life and the Counseling Center. Veterans and active duty military personnel with special circumstances (e.g., upcoming deployments, drill requirements, disabilities) are welcome and encouraged to communicate these, in advance if possible, to the instructor.