



CMSC 426: Principles of Computer Security

Spring 2025 — Syllabus v 1.0

Change Log

Version	Date	Changes	Section
1.0	01/27/2025	Initial Release	All

*****THIS SYLLABUS IS SUBJECT TO CHANGE AT ANYTIME AT THE INSTRUCTOR'S DISCRETION*****

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Section 1: Course Information

Course Number	CMSC 426 [Section 02]
Course Name	Principles of Computer Security
Time & Location(s)	M/W 1730-1845 in Information Technology (ITE) 231
Course Communication	Blackboard & Discord
Textbook (Not Required)	<i>Computer Security: Principles and Practice by William Stallings and Lawrie Brown (Fourth Edition)</i>

Instructor:

Kevin Chen <kevin.chen@umbc.edu>
Computer Science & Electrical Engineering Department
Office Location: ITE 366 & 353
Office Hours: Mondays 2030-2100 & By Appointment

Teaching Assistant:

Chris Abili <cabili1@umbc.edu>
Office Location: TBD
Office Hours: TBD

Grader:

Venkat Pantham <st44372@umbc.edu>
Office Location: TBD
Grading Inquiry Hours: TBD

Course Discord Server:

You are encouraged to join the Discord server for this course. Students may use this for course discussion, but are prohibited from sharing code or answers to assignments/projects/assessments. If caught doing so, it will be considered an academic integrity violation. Please update your nickname to your Firstname Lastname as it appears on the course roster. People who do not update their nickname will be removed from the server.

- Invite Link: <https://discord.gg/WFzDBYA7Ev>

Important Dates:

- 03/10/25 - Review Series: Midterm
- 03/12/25 - Exam Series: Midterm
- 04/02/25 - Speaker Series
- 04/28/25 - Speaker Series
- 05/12/25 - Review Series: Final
- 05/19/25 - Exam Series: Final

Section 2: Course Information

Course Prerequisites:

CMSC 341 with a grade of 'C' or better. CMSC 313 or (CMPE 212 and CMPE 310) with a grade of 'C' or better.

Learning Objectives:

After completing this course, students should be able to do the following:

- Achieve a fundamental understanding of the core topic in computer security and cybersecurity.
- Identify key subfields within computer security and cybersecurity.
- Recognize areas of interest that align with your career goals or academic pursuits.
- Pursue continued learning and specialization in these topics.
- Have a basic cryptographic understanding of cryptography, cyber-kill chain, web security, and more.

This course is designed to provide a comprehensive overview and guide you toward more advanced studies in the field of computer security.

Course Description:

This three-credit introductory course serves as a premier gateway into the expansive field of computer security in modern times. We will begin by exploring fundamental concepts through a computer science lens, laying the groundwork for a deeper understanding. As we progress, we will shift our focus to examine security concepts more commonly found from a cybersecurity and networks perspective.

The goal is to introduce students to a variety of topics such as cryptography, authentication, exploits, attacker lifecycle, network security, malware analysis, etc. The idea is to cover the breadth of security topics, preparing the students for more advanced, in-depth topic area courses that the department offers. Alternatively, if this is the only security course a student takes, they understand the key topics in this area.

A few noteworthy points:

- This course is meant for upper division CMSC/CMPE majors. While the formal prerequisites are listed above, basic coursework in CS will help in giving you the right background to be successful in this course.
- It is my belief that practical, hands-on work is one of the best way to learn about computer security. This course will put a major emphasis on active learning assignments as a method of instruction.
- Multiple virtual machines (VMs) might be distributed throughout the semester for assignments. Please ensure that you have a computer with virtualization support and around 50 GB of free disk space (or an external hard drive / large flash drive). If you do not, please let us know early and we will do our best to accommodate you. This is especially important if you have a Mac with the M series chip, which may be incompatible with VirtualBox or other virtualization software.
- We will use Blackboard as a tool for distributing course material, presenting information/resources, and providing you a grade book. It is your responsibility to check it often. Important announcements will be posted on Blackboard, sent via email, and posted to the #announcements channel on the course Discord server. Minor announcements (e.g. homework corrections and clarifications) will only be posted to the Discord server.

Section 3: Tentative Course Outline

Topics & Order:

- Syllabus, What and Why Cybersecurity (1 Lecture)
- Basics: Ethics, Standards, and Principles (1 Lecture)
- Cyber Incidents: Attacking, Responding, Entry Point (2 Lectures)
- Passwords: RNG, Encryption, Encodings, Hashing, and Cryptanalysis (3 Lectures)
- Infrastructure: Networks, VPNs, and Virtualization (2 Lectures)
- Asymmetric Encryption, Key Exchange, and PKI (2 Lecture)
- Network Security: HTTPS, SSL/TLS, and Heartbleed (1 Lecture)
- Assembly Basics and Reverse Engineering (2 Lectures)
- Binary Exploitation and Buffer Overflow (4 Lectures)
- Malware and Malware Analysis (2 Lectures)
- Policy, Intelligence, and Modeling (1 Lecture)
- Future of Cyber: Memory Safe Languages, Formal Methods, Zero Trust, Containerization, LLM, and Post-Quantum (2 Lectures)
- Wrapping Up: Full Exploits and Cyber Careers (1 Lecture)

Section 4: Course Work & Grading

Required Work:

- **Speakers:** There will be two lectures that are part of the Speaker series. Attendances and active participations for those lectures are what this portion of your grade will be made up of. To get credit, you will need to be physically present for those lectures and actively participate. The goal of this being a portion of your grade is to provide you opportunities exposure you to real-world scenarios and to provide you some easy points.
- **Activities:** There will be an inexact number of activities that are given during lectures throughout the semester. The goal of these activities is to engage students during lectures, collaborate with your peers, help gauge student understanding, and determine points of weakness.
- **Assignments:** There will be around 6–12 assignments throughout the semester. The assignment will be graded for correctness and used to aid in your learning. The reason for an inexact amount of assignments is to provide a level of flexibility to tailor the assignment based on the interest and needs of the class. Precise details on how each assignment is evaluated will be released along with the assignment.
- **Extra Credit:** There will be opportunities for extra credit on top of assignments. The goal of extra credit would be to provide those interested with additional opportunities to further their understanding and dive deeper.

Exceptions:

We will model the exceptions in this class after the PTO benefits in the real world as part of the immersive learning experience. Each student will have the following:

- (1) Excused Assignment
- (2) Non-Standard Excused Absences
- (Unlimited) University Excused Absences

Excused Assignment works by removing (1) assignment category engagement's responsibilities/point values from your total grade, and may be used anytime during the semester within 2 weeks of the assignments due date. Including non-completed or completed work, aka this works like assignment drops that you are familiar with in previous courses.

Non-Standard Excused Absences works by excusing you from (2) activities or speaker engagements' responsibilities/point values from your total grade, and may be used anytime during the semester. This can only be used for anything in where attendance will have a direct impact on your grade. **Note: Lecture and Review series' attendance will not have a direct impact on your grades, but can have an indirect impact when it comes to missing in-class content/activities, performances on assignment/exams, and consideration for final grades.**

Grading Breakdown:

In the table below, you will find the breakdown of all the activities that we might complete along with each of their weight. The necessary score column specifies the **minimum, but not sufficient**, scores to pass the course.

Engagements	Weight	Necessary Score
Speaker	5%	10%
Activities	5%	10%
Assignments	50%	15%
Midterm Exam	15%	25%
Final Exam	25%	25%

Final Grades:

In the table below you will find how your final grades will be determined based on your grade percentage

Grades	Weight
A	$\geq 90\%$
B	80-89%
C	70-79%
D	60-69%
F	$\leq 59\%$

Section 5: Course Policies

Technology & Knowledge Abuse:

Abuse of the knowledge or experience you gain in the course may subject you to discipline under UMBC policy and/or criminal prosecution. Do not expect your status as a student to protect you if you break the law! Hacking into any campus system or assets (other than systems approved for such a purpose) is a violation of UMBC policy, and may result in disciplinary action, possibly including expulsion.

Generative AI:

Generative AI should never be used unless you have been given explicit permissions. Even if you have been given permission for it to be used, you should always document and cite exactly how you used GenAI to assist you on any coursework.

Attendance:

Like mentioned above in previous sections, attendance outside of Participation and Speaker series will not have a direct impact on your grade, but could have an indirect impact on your grades. On top of that, students who attend class generally perform better than their non-attending peers. Purely viewing just the lecture slides is **NOT** a substitute for attending class, and you may be responsible for material covered during class that is not on the slides.

Late Policy:

No unexcused late work will be taken without prior arrangements. You will have certain exceptions that should help offset unexpected events. If you need more than your allocated exception due to extraneous circumstances, please communicate with me ASAP.

Netiquette:

All official communications should be made via email, but you may reach out to me over Discord direct message for quick things. I am pretty quick in responding generally, but the rule of thumb is you should receive a response within 24-48 business hours at the latest. As a note, there will be a lot of questions about assignments on the days they are due, so it's always best to start assignments early and ask questions before the last minute!

Let's Get Real:

I was once a student, and I am not blind to the tricks that student use. The best policy here is to be honest with me. We are all human, and I understand that things happen, so communicate with me if there is any reason you think you might be unsuccessful in this course. I will be honest with you as long as you are being honest with me.

Section 6: University Policies

Academic Integrity

Academic integrity is an important value at UMBC. By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC's scholarly community in which everyone's academic work and behavior are held to the highest standards of honesty. Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of academic dishonesty, and they are wrong. Academic misconduct could result in disciplinary action that may include, but is not limited to, suspension or dismissal.

Abuse of Resources

Abuse of the knowledge or experience you gain in this course may subject you to discipline under UMBC policy and/or criminal prosecution. Do not expect your status as a student to protect you if you break the law! Hacking into campus computers (other than systems approved for such a purpose) is a violation of UMBC policy, and may result in disciplinary action possibly including expulsion, in addition to possible criminal charges.

Accessibility and Disability Accommodations, Guidance and Resources

Accommodations for students with disabilities are provided for all students with a qualified disability under the Americans with Disabilities Act (ADA & ADAAA) and Section 504 of the Rehabilitation Act who request and are eligible for accommodations. The Office of Student Disability Services (SDS) is the UMBC department designated to coordinate accommodations that creates equal access for students when barriers to participation exist in University courses, programs, or activities.

If you have a documented disability and need to request academic accommodations in your courses, please refer to the SDS website at sds.umbc.edu for registration information and office procedures.

- SDS email: disAbility@umbc.edu
- SDS phone: [410-455-2459](tel:410-455-2459)

If you will be using SDS approved accommodations in this class, please contact the instructor to discuss implementation of the accommodations. During remote instruction requirements due to COVID, communication and flexibility will be essential for success.

Sexual Assault, Sexual Harassment, and Gender Based Violence and Discrimination

[UMBC Policy](#) in addition to federal and state law (to include Title IX) prohibits discrimination and harassment on the basis of sex, sexual orientation, and gender identity in

University programs and activities. Any student who is impacted by sexual harassment, sexual assault, domestic violence, dating violence, stalking, sexual exploitation, gender discrimination, pregnancy discrimination, gender-based harassment, or related retaliation should contact the University's Title IX Coordinator to make a report and/or access support and resources. The Title IX Coordinator can be reached at titleixcoordinator@umbc.edu or 410-455-1717.

You can access support and resources even if you do not want to take any further action. You will not be forced to file a formal complaint or police report. Please be aware that the University may take action on its own if essential to protect the safety of the community.

If you are interested in making a report, please use the [Online Reporting/Referral Form](#). Please note that, if you report anonymously, the University's ability to respond will be limited.

Notice that Faculty and Teaching Assistants are Responsible Employees with Mandatory Reporting Obligations

All faculty members and teaching assistants are considered Responsible Employees, per UMBC's [Policy on Sexual Misconduct, Sexual Harassment, and Gender Discrimination](#). Faculty and teaching assistants therefore required to report all known information regarding alleged conduct that may be a violation of the Policy to the Title IX Coordinator, even if a student discloses an experience that occurred before attending UMBC and/or an incident that only involves people not affiliated with UMBC. Reports are required regardless of the amount of detail provided, and even in instances where support has already been offered or received.

While faculty members want to encourage you to share information related to your life experiences through discussion and written work, students should understand that faculty are required to report past and present sexual harassment, sexual assault, domestic and dating violence, stalking, and gender discrimination that is shared with them to the Title IX Coordinator so that the University can inform students of their [rights, resources, and support](#). While you are encouraged to do so, you are not obligated to respond to outreach conducted as a result of a report to the Title IX Coordinator.

If you need to speak with someone in confidence, who does not have an obligation to report to the Title IX Coordinator, UMBC has a number of [Confidential Resources](#) available to support you:

[Retriever Integrated Health](#) (Main Campus): 410-455-2472; Monday – Friday, 8:30 a.m. — 5 p.m.; For After-Hours Support, Call 988.

[Center for Counseling and Well-Being](#) (Shady Grove Campus): 301-738-6273; Monday – Thursday, 10:00a.m. — 7:00 p.m. and Friday 10:00 a.m. — 2:00 p.m. (virtual) [Online](#)

Appointment Request Form

Pastoral Counseling via [The Gathering Space for Spiritual Well-Being](#): 410-455-6795; i3b@umbc.edu; Monday – Friday, 8:00 a.m. — 10:00 p.m.

Other Resources

[Women's Center](#) (open to students of all genders): 410-455-2714; womenscenter@umbc.edu; Monday – Thursday, 9:30 a.m. — 5:00 p.m. and Friday, 10:00 a.m. — 4 p.m.

[Shady Grove Student Resources](#), [Maryland Resources](#), [National Resources](#).

Child Abuse and Neglect

Please note that Maryland law and [UMBC policy](#) require that faculty report all disclosures or suspicions of child abuse or neglect to the Department of Social Services and/or the police, even if the person who experienced the abuse or neglect is now over 18.

Additional Policy and Resources

All additional policies and resources please refer to the [Equity and Inclusion Policies and Resources](#) for the following:

- Pregnant and Parenting Students
- Religious Observances & Accommodations
- Hate, Bias, Discrimination and Harassment

*****BY REMAINING IN THIS COURSE, YOU FULLY UNDERSTAND AND AGREE TO THE ABOVE POLICIES*****