MET CS 595 Cybersecurity Fundamentals
2026 Summer 2 Online Course Syllabus

Instructor

Chuck Pak, Ph.D. cpak4@bu.edu

Course Duration

Start: June 30, 2026
End: August 17, 2026

Course Credits

4 credits

Course Description

This course introduces fundamental concepts, principles of cybersecurity and their use in the development of security mechanisms and policies. Topics include basic risk assessment and management; basic legal and ethics issues, various cyber attacks, defense methods and tools; security principles, models and components; different crypto protocols, techniques and tools, including symmetric and asymmetric encryption algorithms, hashing, public key infrastructure, and how they can be used; security threats and defense to hardware, operating systems, networks and applications in modern computing environments. Hands-on labs using current tools are provided and required.

Prerequisites

MET CS 535 or MET CS 625, or with advance permission of the instructor.

Course Learning Objectives

Upon successful completion of this course students will be able to:

- Explain the fundamental concepts of the cybersecurity discipline.
- Describe basic risk assessment and management.
- Describe basic elements of a cryptographic system, and how crypto can be used.
- Identify strengths and weaknesses, modes, implementation issues and applications of different crypto protocols, techniques and tools including symmetric and asymmetric algorithms, encryption and hashing, PKI, etc.
- Identify potential cyber attacks, as well as cyber defense tools, methods and components to repel attacks.
- Describe appropriate measures to be taken should a system compromise occur.

- Properly use the vocabulary associated with cybersecurity.
- Explain principles of cybersecurity and how they should be applied in the development of security mechanisms and policies.
- Describe the security implications of various components in a computer system such as, hardware, OS, applications, network, and the user.
- Describe the security implications of the emerging technologies such as mobile and IoT.

Course Outline

Module 1: Introduction to Cybersecurity

- Basic concepts and terminology in cybersecurity
    - Motivation to study cybersecurity, real world examples of cyberattacks
    - Branches of cybersecurity
    - Basic concepts: CIA, vulnerability, threat, risk, attack, compromise, control
- Legal issues and ethics
- Risk analysis and security management

Module 2: Attacks and Defense

- Malware: virus, worms, trojan horse, rootkit, zombie, bot, botnet, ransomware
- Bug: buffer overflow, integer overflow, TOCTTOU, covert channel
- Security model: threat model, trust model, trusted computing base
- Security principles and countermeasures

Module 3: Introduction to Crypto

- The role and property of crypto
- Terminology: Alice, Bob, Eve, encrypt, decrypt, cryptography, cryptanalysis
- Classical encryption: Caesar Cipher, ROTx, substitution cipher
- Symmetric encryption: DES, AES
- Key negotiation: DH
- Asymmetric encryption: RSA
- Hash: MD, MAC, HMAC
- Data authenticity and confidentiality

Module 4: Authentication and Authorization

- Something you know, you are, and you have: password, biometrics, token
- Digital signature and Kerberos
- Digital certificate and PKI
- Access policy, access control matrix, access control list, capability, RBAC

Module 5: Network Security and Web Security

- Threats to network: data interception, replay attack, port scanning, DoS, DDoS,

MITM
- Network defense: IPsec, VPN, Firewalls
- Browser attacks, email attacks, misleading/malicious web content

Module 6: Cyber System Security
- Hardware security: meltdown, spectre, TEE
- Virtualization and Cloud computing security
- Mobile security and IoT security

Module 7 - Prepare for and take the final exam
- You will prepare for and take the proctored final exam.

The course will remain open two weeks after the final exam, so that you can continue discussions and ask any questions about database technology, your grades or the course. This is also a time when we enter into a dialog where we endeavor to learn from you how we can modify the course so that it better meets your needs.

Instructor Bio

Chuck Pak, Ph.D.
Lecturer, Computer Science Department
Boston University, Metropolitan College, Department of Computer Science

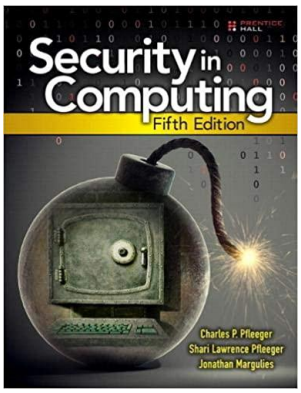
Charles Pak earned his Ph.D. in Information Security from Nova Southeastern University, an M.S. in Network Security from Capitol Technology University, and a B.S. in Electrical Engineering from Penn State University. He has taught Information Systems (IS) courses for over 25 years as an IS practitioner and professor. He has managed U.S. Federal Government data centers for over 20 years, including personnel. He has designed, tested, implemented, and maintained many of these enterprise network sites (largest in the world) that encompasses distributed sites across the U.S. as well as the international sites. He has

managed state-of-the art systems for military and federal government missions for which he was deployed.

His research topics include Cyber Security, Critical Infrastructure Protection (CIP), PKI, Cyber Counter Terrorism, and Risk Assessment & Management. He has published several research papers in Information Security. As a practitioner, he holds several industry certifications: CISM, CRISC, CISSP, ITIL, SSCP, MCSE, MCT, Security +, and CCNA.

Course Materials

Required Textbook



Pfleeger, C. P., Pfleeger, S. L., & Margulies, J. (2015)
Security in Computing **(5th ed.)**

Publisher: Pearson/Prentice Hall

ISBN: 9780134085043

An e-book is available via BNC First Day™. Refer to "Accessing Your Materials" below for more information.

Accessing Your Materials

WELCOME TO FIRST DAY™ DELIVERY FOR YOUR COURSE
MET CS 595

To enhance your learning experience and simplify access to the right materials for your class, your course materials have been integrated directly into your course.

BENEFITS OF THIS PROGRAM

- Exclusive preferred pricing
- Guaranteed the right materials
- Single Sign-On
- Ready to go on day one
- Course materials charge will be placed on your student account
- Option to Opt-Out on the first day of class.

ACCESSING YOUR MATERIALS

To access your required materials for your course, Log into Blackboard and follow instructions provided by your instructor.
Boston University will bill you at the discounted price as a First Day course material charge on your student account later in the semester.

Please be advised it is NOT recommended that you Opt-Out, as these materials are required by your professor to complete the course. You can choose to Opt-Out on the first day of class, but you will be responsible for purchasing your course materials at the Opt-Out price.

Study Guide

This course starts on a **Tuesday**. The modules in this course run from **Tuesday to Monday**.

Module 1 Study Guide and Deliverables
(June 30 – July 6, 2026)

Theme: Introduction to Cybersecurity

Topics:

- Basic concepts and terminology in cybersecurity
  - Motivation to study cybersecurity, real world examples of cyberattacks
  - Branches of cybersecurity
  - Basic concepts: CIA, vulnerability, threat, risk, attack, compromise, control
- Legal issues and ethics
- Risk analysis and security management

Readings:

- Chapter 1
- Chapter 10.1 – 10.4
- Chapter 11.1
- Chapter 11.5 – 11.6

Assignments:

Lab 1 due **Tuesday, July 7, at 6:00 AM ET**

Assessments:

Quiz 1 due **Tuesday, July 7, at 6:00 AM ET**

Discussions:

Discussion 1 posts **due Tuesday, July 7 at 6:00 AM ET**. Any posts after the due time will not be included in the grading process.

Live Classroom:

- Lecture: **Tuesday, June 30, 6:00 PM –7:30 PM ET**
- Facilitator office hour: TBD

Module 2 Study Guide and Deliverables
(July 7 – July 13, 2026)

Theme: Attacks and Defense

Topics:

- Malware: virus, worms, trojan horse, rootkit, zombie, bot, botnet, ransomware
- Bug: buffer overflow, integer overflow, TOCTTOU, covert channel
- Security model: threat model, trust model, trusted computing base
- Security principles and countermeasures

Readings:

Chapter 3

Assignments:

- Assignment 1 due **Tuesday, July 14, at 6:00 AM ET**
- Lab 2 due **Tuesday, July 14, at 6:00 AM ET**

Assessments:

Quiz 2 due **Tuesday, July 14, at 6:00 AM ET**

Discussions:

None

Live Classroom:

- Lecture: **Tuesday, July 7, 6:00 PM – 7:30 PM ET**
- Facilitator office hour: TBD

Module 3 Study Guide and Deliverables
(July 14 – July 20, 2026)

Theme: Introduction to Crypto

Topics:

- The role and property of crypto
- Terminology: Alice, Bob, Eve, encrypt, decrypt, cryptography, cryptanalysis
- Classical encryption: Caesar Cipher, ROTx, substitution cipher
- Symmetric encryption: DES, AES
- Key negotiation: DH
- Asymmetric encryption: RSA
- Hash: MD, MAC, HMAC
- Data authenticity and confidentiality

Readings:

- Chapter 2.3
- Extra reading: Chapter 12.1 – 12.5

Assignments:

Lab 3 due **Tuesday, July 21, at 6:00 AM ET**

Assessments:

Quiz 3 due **Tuesday, July 21, at 6:00 AM ET**

Discussions:

None

Live Classroom:

- Lecture: **Tuesday, July 14, 6:00 PM – 7:30 PM ET**
- Facilitator office hour: TBD

Module 4 Study Guide and Deliverables

(July 21 – July 27, 2026)

Theme: Authentication and Authorization

Topics:

- Something you know, you are, and you have: password, biometrics, token
- Digital signature and Kerberos
- Digital certificate and PKI
- Access policy, access control matrix, access control list, capability, RBAC

Readings:

- Chapter 2.1
- Chapter 2.2

Assignments:

- Assignment 2 due **Tuesday, July 28, at 6:00 AM ET**
- Lab 4 due **Tuesday, July 28, at 6:00 AM ET**

Assessments:

Quiz 4 due **Tuesday, July 28 at 6:00 AM ET**

Discussions:

Discussion 2 posts due **Tuesday, July 28 at 6:00 AM ET**. Any posts after the due time will not be included in the grading process.

Live Classroom:

- Lecture: **Tuesday, July 21, 6:00 PM – 7:30 PM ET**
- Facilitator office hour: TBD

Module 5 Study Guide and Deliverables
(July 28 – August 3, 2026)

Theme: Network Security and Web Security

Topics:

- Threats to network: data interception, replay attack, port scanning, DoS, DDoS, MITM
- Network defense: IPsec, VPN, Firewalls
- Browser attacks, email attacks, misleading/malicious web content

Readings:

- Chapter 6.1 – 6.2
- Chapter 6.4 – 6.5
- Chapter 6.7
- Chapter 4.1 – 4.3

Assignments:

Lab 5 due **Tuesday, August 4, at 6:00 AM ET**

Assessments:

Quiz 5 due **Tuesday, August 4, at 6:00 AM ET**

Discussions:

Discussion 3 posts due **Tuesday, August 4 at 6:00 AM ET**. Any posts after the due time will not be included in the grading process.

Live Classroom:

- Lecture: **Tuesday, July 28, 6:00 PM – 7:30 PM ET**
- Facilitator office hour: TBD

Module 6 Study Guide and Deliverables
(August 4 – August 10, 2026)

Theme: Cyber System Security

Topics:

- Hardware security: meltdown, spectre, TEE
- Virtualization and Cloud computing security
- Mobile security and IoT security

Readings:

- Chapter 8.1 – 8.4
- Chapter 4.4

- Chapter 13.1

Assignments:

Assignment 3 due **Tuesday, August 11, at 6:00 AM ET**

Assessments:

Quiz 6 due **Tuesday, August 11, at 6:00 AM ET**

Discussions:

None

Live Classroom:

- Lecture: **Tuesday, August 4, 6:00 PM – 7:30 PM ET**
- Facilitator office hour: TBD

Course Evaluation:

Please complete the course evaluation once you receive an email or Blackboard notification indicating the evaluation is open. Your feedback is important to MET, as it helps us make improvements to the program and the course for future students.

Final Exam Details

The Final Exam is a proctored exam available from **Wednesday, August 12 at 6:00 AM ET to Saturday, August 15 at 11:59 PM ET**.

The Computer Science Department requires that all final exams be administered using an online proctoring service that you will access via your course in Blackboard. Detailed instructions regarding your proctored exam will be forthcoming from the Assessment Administrator.

The Final Exam will be **open book/open notes** and is accessible during the final exam period. You can access it from the Assessments section of the course. Your proctor will enter the password to start the exam.

The following materials are allowed to use during the final exam:

- Use of the physical and/or ebook textbook.
- Use of any printed materials.
- Use of three pieces of blank scratch paper.

Final Exam Duration: **3 hours**.

Grading Information

It is important for each student to participate on a regular basis and complete all aspects of this course. This course is designed to include a major portion of learning by interacting (asynchronously) with the other students in the class, and the grade is therefore

dependent on this activity. Course quizzes are cumulative in what they cover. This means that a quiz may include questions on material from prior modules.

Grading Structure and Distribution

The following tables depict how final grades will be calculated. Only exceptions necessary to maintain academic standards will be allowed.

Overall Grading Percentages	
Homework assignments	15%
Quizzes	18%
Lab exercises	25%
Discussion and class participation	12%
Proctored final exam	30%

Grading Scale	
A	≥ 93
A-	≥ 90 and < 93
B+	≥ 85 and < 90
B	≥ 80 and < 85
B-	≥ 77 and < 80
C+	≥ 74 and < 77
C	≥ 70 and < 74
C-	≥ 65 and < 70
D	≥ 60 and < 65
F	< 60

Homework Assignments and Lab Exercises

- There are 3 homework assignments and 5 lab exercises. Both homework assignments and lab exercises are mandatory, must be completed and submitted in a timely manner, and are required to be submitted via Online Campus for this course.
- Each assignment, including lab, quiz, discussion, etc., has a deadline. All assignments are assessed a 25% per-day late penalty, up to a maximum of 4 days. No assignments will be accepted four days after the deadline. Students with legitimate reasons who contact the professor before the deadline may apply for extension.
- All homework assignments or lab exercises are identified within the Online campus Study Guide.
- File names for assignment documents should be:
  CS595-HW<number>-<student last name>.doc

An example assignment document file name is:
CS595-HW5-Jacobs.doc

- File names for lab exercise documents should be:
  CS595-LAB<number>-<student last name>.doc
  An example lab exercise document file name is:
  CS595-LAB5-Jacobs.doc

- Include your name and assignment number in the header and a page number in the footer of you assignment submission document.
- Assignment submission documents MUST be in Word format with the file extension .doc, rather than .docx.
- Quoted material and citations must follow the American Psychological Association (APA) format with a reference section at the end of a student's submitted work. Please refer to the APA Formatting and Style Guide web site for guidance on following the APA style guide.
- Wikipedia is a useful starting point for finding information about a subject BUT NOT an acceptable direct reference source. One should only reference or quote from primary (source) documents.

Quizzes

There will be six quizzes, one per every module. The purpose of quizzes is to help students practice and keep current with the course material.

Discussions

Students will be participating in three graded discussions, one for Module 1, Module 4, and Module 5. The purpose of the discussions is to help students reflect, synthesize, do further research, and make connections between what you have learned and real-world applications. Exchanging thoughts among students will help you learn from your peers. Check out the Discussion Grading Rubric below.

Final Exam

There will be a proctored Final Exam in this course. Detailed instructions regarding your proctored exam will be forthcoming from the Assessment Administrator.

Delays

In the case of serious or emergency situations, or if, for any reason, you are unable to meet any assignment deadline, contact your instructor.

Discussion Grading Rubric

Graded discussion periods are held Day 1 of each module until 6:00 AM ET on Day 1 of the following module. You're certainly welcome to continue a discussion past the grading period, but that additional posted material will not affect your discussion grade. The discussion grading rubric below is the guide we use to evaluate your discussion contributions.

Discussion Grading Rubric					
Criteria	**51–60**	**61–70**	**71–80**	**81–90**	**91–100**
Participation	Very limited participation	Participation generally lacks frequency or relevance	Reasonably useful relevant participation during the discussion period	Frequently relevant and consistent participation throughout the discussion period	Continually relevant and consistent participation throughout the discussion period
Community	Mostly indifferent to discussion	Little effort to keep discussions going or provide help	Reasonable effort to respond thoughtfully, provide help, and/or keep discussions going	Often responds thoughtfully in a way that frequently keeps discussions going and provides help	Continually responds thoughtfully in a way that consistently keeps discussions going and provides help
Content	No useful, on-topic, or interesting information, ideas or analysis	Hardly any useful, on-topic, or interesting information, ideas or analysis	Reasonably useful, on-topic, and interesting information, ideas and/or analysis	Frequently useful, on-topic, and interesting information, ideas and analysis	Exceptionally useful, on-topic, and interesting information, ideas and analysis
Reflection and Synthesis			No significant effort to clarify, summarize or synthesize topics raised in discussions	Contributes to group's effort to clarify, summarize or synthesize topics raised in discussions	Leads group's effort to clarify, summarize or synthesize topics raised in discussions

Ungraded Items

Live Classroom Sessions

There will be weekly live classroom sessions conducted by your instructor.

During these online sessions the instructor will present and clarify material from the week's readings, as well as answer students' questions. Attendance is not required at these sessions but is highly recommended. All on-line sessions will be recorded and archived. The archived recordings will be accessible from the "Live Classroom and Offices" folder on the Blackboard course's Content page.

Policy for the Use of Generative AI

Students should learn how to use AI text generators and other AI-based assistive resources (collectively, AI tools) to enhance rather than damage their developing abilities as writers, coders, communicators, and thinkers.

When using Generative AI in coursework, students shall:

1. Give credit to AI tools whenever used, even if only to generate ideas rather than usable text or illustrations.
2. When using AI tools on assignments, add an appendix showing (a) the entire exchange, highlighting the most relevant sections; (b) a description of precisely which AI tools were used (e.g. ChatGPT private subscription version or DALL-E free version), (c) an explanation of how the AI tools were used (e.g. to generate ideas, turns of phrase, elements of text, long stretches of text, lines of argument, pieces of evidence, maps of conceptual territory, illustrations of key concepts, etc.); (d) an account of why AI tools were used (e.g. to save time, to surmount writer's block, to stimulate thinking, to handle mounting stress, to clarify prose, to translate text, to experiment for fun, etc.).
3. Not use AI tools during in-class examinations, or assignments, unless explicitly permitted and instructed.
4. Employ AI detection tools and originality checks prior to submission, ensuring that their submitted work is not mistakenly flagged.
5. Use AI tools wisely and intelligently, aiming to deepen understanding of subject matter and to support learning.

For more details, please see the Generative AI Assistance (GAIA) policy.

Course Policies and Academic Conduct

Academic Integrity: Plagiarism is the passing off of another's words or ideas as your own, and it

is a serious academic offense. Plagiarism and cheating also defeat the purpose of getting an education. Plagiarism and cheating cases will be handled in accordance with the disciplinary procedures described in the College of Arts and Sciences Academic Conduct Code. You are expected to know and abide by the code, which can be read online: Academic Conduct Code. Penalties range from failing an assignment or course (first offense) to suspension or expulsion from BU. If in doubt, cite your source. If you have any questions about academic integrity, please ask your instructor.

Incidents of academic misconduct will be reported to the Academic Conduct Committee (ACC). The ACC may suspend/expel students found guilty of misconduct.

Important Message on Final Exams

Dear Boston University Computer Science Online Student,

As part of our ongoing efforts to maintain the high academic standard of all Boston University programs, including our online MSCIS degree program, the Computer Science Department at Boston University's Metropolitan College requires that each of the online courses includes a proctored final examination.

By requiring proctored finals, we are ensuring the excellence and fairness of our program. The final exam is administered online.

Specific information regarding final-exam scheduling will be provided approximately two weeks into the course. This early notification is being given so that you will have enough time to plan for where you will take the final exam.

I know that you recognize the value of your Boston University degree and that you will support the efforts of the University to maintain the highest standards in our online degree program.

Thank you very much for your support with this important issue.

Regards,

Professor Lou Chitkushev, Ph.D.
Associate Dean for Academic Affairs
Boston University Metropolitan College

Disability and Access Services

In accordance with University policy, every effort will be made to accommodate students with respect to speech, hearing, vision, or other disabilities. Any student who may need an

accommodation for a documented disability should contact Disability and Access Services at 617-353-3658 or at access@bu.edu for review and approval of accommodation requests.

Once a student receives their accommodation letter, they must send it to their instructor and/or facilitator each semester. They must also send a copy to their Faculty & Student Support Administrator, who may need to update the course settings to ensure accommodations are in place. Accommodations cannot be implemented if the student does not send their letter.

Registration Information and Important Dates

View the drop dates for your course.

Withdraw or drop your course.

- If you are dropping down to zero credits for a semester, please contact your college or academic department.
- **Nonparticipation in your online course does not constitute a withdrawal from the class.**
- If you are unable to drop yourself on MyBU Student Portal, please contact your college or academic department.
- Online courses will open to students in Blackboard on the first day of the term.
- Online courses close to students three weeks after the last day of the term. Please plan to download and save any assignments or material you'd like to keep by that date.