COURSE SYLLABUS

In this course, students will systematically study the fundamental principles of computer system security, including authentication, hardware vulnerabilities, software vulnerabilities, and web security. Most of these principles will be studied within the scope of concrete systems, such as Linux and Windows. The course emphasizes "learning by doing" and requires students to read assigned papers and conduct a series of lab exercises (projects). Through these labs, students can enhance their understanding of the principles, and be able to apply those principles to solve real problems.

COURSE INFORMATION

- Name: CSCI 7120 Advanced Topics in Computer Security
- Credits: 3
- Location: Hull McKnight GA Cyber Center Rv1-2400
- Day/time: Tue/Thu 11:30-12:45
- Course Type: In-person

CONTACT

- Name: Hoda Maleki
- Department: School of Computer and Cyber Sciences
- Campus: Riverfront Campus
- Office Location: RV1- 2810
- Email: hmaleki@augusta.edu
- Office phone: 706-721-0553

OFFICE HOURS

Only by appointment. Please email me to set an in-person or virtual meeting.

IMPORTANT DATES

Take note of the following important dates:

- First day of class: 08/17/2022
- Last day to Withdraw without Penalty: 08/23/2022
- Mid-term: No midterm
- Last day of class: 12/07/2022
- Final Exam: 12/15/2022 Time: 11-13. No Final Exam.

HOLIDAYS AND CLASS CANCELATION

Conference attending (No class): 09/07/2022- 09/10/2022

Fall Pause: 10/13/2022- 10/14/2022

No class: 11/22/2022

Thanksgiving Pause: 11/23/2022- 11/25/2022

LEARNING OBJECTIVES

After completion of the course, students should be able to:

- explain security principles,
- explain how various security mechanisms work, and correlate these security mechanisms with security principles,
- compare various security mechanisms, and articulate their advantages and limitations,
- apply security principles to solve problems,
- analyze and evaluate software systems for their security properties,
- evaluate risks faced by computer systems,
- explain how various attacks work,
- detect common vulnerabilities in software,
- design and implement basic security mechanisms to protect computer systems,
- describe and generalize various software vulnerabilities.

RELATIVE TOPIC EMPHASIS	TOPIC CLASS HOURS
Introduction and basic principles of Computer Security	3
Software Security	4
Hardware Security	4
Network Security	4
Cryptography	4
Web Security	4
Paper Presentation	13

PREREQUISITES

Bachelor's degree in Computer Science or equivalent. This course requires no prior experience in security and privacy but assumes the willingness to seek out and read background material as needed. Although it is not a requirement, knowledge of core topics of security and privacy would be very helpful.

REQUIRED RESOURCES, MATERIALS, AND TECHNOLOGY

For this course, you must have access to the following resources and/or technologies:

- **D2L**: The assignments will be uploaded in Desire-to-Learn (D2L). Students should submit their homework and project in D2L.
- **Other materials will be provided online at no cost to students**.

To complete work outside of campus labs or in the case course presentation moves from in-person mode to online mode students will need access to a reliable computer running a relatively recent, mainstream operating system; a reliable, moderately speedy internet connection, webcam, and microphone is also required.

If you do not have the required devices (for the transition to online mode), please inform me as soon as possible.

A VM image will be provided to the students for completing lab exercises and completing projects.

Note: A student's personal information technology (IT) infrastructure cannot be used as an excuse for failure to complete work -- if the work can be completed on-campus computers then the instructor has applied due diligence in establishing the technical tractability of the assignments. By all means, contact the instructor if something isn't working but students are responsible for their IT resources.

WHAT I EXPECT FROM YOU

Attendance & Participation:

You are expected to participate in class discussions and activities. Attendance is a prerequisite, not a substitute for class participation. Grades for participation will be based on in-class activities such as participation in the discussions, asking questions, responding to questions from other students, completing the in-class projects, and being prepared.

Reading Assignments:

We will read and discuss a few papers per module. Every student must complete the assigned reading prior to the indicated class so that they can participate fully in class discussions. To facilitate productive class discussions, students must submit a review of **only one** of the assigned papers to the D2L **a day before the discussion class (the latest time is 11:59 pm).** Reviews should consist of three brief paragraphs in students' own words with the following structure:

Paragraph 1:

Explain the problem and motivation.
Explain the main ideas and technical contributions of the work.
Compare this work with the main prior work.
Explain the methodologies used for evaluation.

Paragraph 2:

List three key strengths and three key weaknesses of this paper. The focus should be more on approach and evaluation.

Paragraph 3:

List any future work that you might consider in this line of research.

Assignments:

There will be six projects (that will be periodically assigned to help you improve your understanding of the material). You are expected to complete at least five out of the six projects. The student must complete the projects on time (the deadline will be given in each project assignment). A handwritten project report is not accepted.

Each project is explained in the class first and then the student will use their knowledge to implement it. Each project will be done individually unless instructed to do it in a group. Note that the students can collaborate in solving a problem. However, at the end of the day, each person should implement the project by him/herself and create a unique report.

In order to complete the projects, you can either use the virtual machine that we have set on NetLab+ (https://pod1.cyberlab.augusta.edu/) or download all the required material and configure them as instructed at https://seedsecuritylabs.org/lab_env.html. In the case that you decide to use the NetLab+, you need to log in using your AU usernames (no augusta.edu on the end of it), and must be in all capital letters. If you are new to NetLab+, your password is **Welcome12345!** . Make sure to change it once you are logged in. If this doesn't work or you forgot your password, send me an email and I will reset your password.

Leading Two Class Discussions

Students will be the discussion leader for class discussions of two different papers (on two different days). As the discussion leader, the student must prepare a **20-minute** presentation that covers the main technical contributions of the paper and a 15-minute discussion. The moderator must prepare **at least 5 discussion questions** to lead the 15-minute discussion time. Prior to the beginning of class, the student should email their slides as a PDF to the instructor. Other students must participate and contribute to the discussion.

The rest of the students have to read and write a paper review (as explained in Reading Assignment) for at least one paper per discussion day. The discussion/presentation days are given in the class schedule.

Midterm And Final Exams:

There will be no midterm exam or final exam.

Quizzes:

No quizzes.

Announcements:

I will post important class information in announcements. Please edit your notifications so that you receive an email when I post an announcement. Failing to make this edit can result in you not receiving importing information in a timely manner.

GRADE CALCULATIONS

Here is how I calculate your grade

ACTIVITY	POINTS	PERCENTAGE OF FINAL GRADE
Class Participation	15	15%
Leading two discussion	15	15%
Project	50	50%
paper summaries	20	20%

FINAL GRADE DISTRIBUTION

Here is how I calculate your grade

FINAL GRADE	FINAL SCORE
A (Excellent)	91-100
A-	89-90
B+ (Very good)	87-88
B (Good)	81-86
B-	77-80

COVID-19 REQUIREMENTS

The University has implemented specific requirements to minimize exposure to COVID-19 and support the safety of all during the pandemic. These requirements apply to all persons on campus (faculty, staff, students, and visitors). These requirements are subject to change. Visit https://jagwire.augusta.edu/coronavirus/ and https://www.augusta.edu/reopening/ for the latest details.

Where To Go For More Information About COVID-19?

- Augusta University COVID-19 resources
  - Campus Reopening: www.augusta.edu/reopening
  - Welcome Back information for students: www.augusta.edu/welcome-back
  - COVID-19 resources on Jagwire https://jagwire.augusta.edu/coronavirus/
  - Frequently Asked Questions for students: https://my.augusta.edu/reopening/faq
- Guidance on symptoms and getting tested:
  - Free virtual screenings: www.augustahealth.org/expresscare/covid-19-virtual-screening
  - AU Health System COVID-19 Hotline: **706-721-1852**
  - Student Health Clinic: 706-721-3448 or www.augusta.edu/shs/

POLICIES

Attendance Policy

You are expected to be on time, and to attend class regularly. Excessive absences (>10%) are grounds for withdrawal from the course without warning.

Late Paper Reviews Policy

To accommodate for unavoidable circumstances, you get two 1-day extensions for paper summaries. You can drop **one** summary. Save these for circumstances such as falling ill or interviewing. Beyond the exceptions mentioned here, the student will not get any points for a late paper review.

Late Project Report Policy

Students will be penalized 25% for every day it is late beyond the designated deadline. You are required to submit satisfactory versions of these reports within 4 days of the deadline to pass the class. This policy will be used for each project report.

Academic Integrity

In an academic community, honesty and integrity must prevail if the work is done and the honors awarded are to receive their respect. The erosion of honesty is the academic community's ultimate loss. The responsibility for the practice and preservation of honesty must be equally assumed by all of its members. Any type of dishonesty in securing those credentials, therefore, invites serious sanctions, up to and including, a "WF" or "F" in the course, and expulsion from the institution. Please reference the [AU Academic Honesty](#) for further details and specific definitions of cheating and plagiarism. Unethical behavior of students in any form is not acceptable and will not be tolerated in the School of Computer and Cyber Sciences. Academic dishonesty (see definitions in the following sections) - cheating on exams, plagiarism of the work of others, unapproved collaboration on graded work, and the like - will be dealt with immediately and with clear consequences. Depending on the nature and severity of the problem, a student who is guilty of any such violation may be: 1) withdrawn from the course with a grade of WF (counted as an F in the GPA); 2) given a grade of zero on the assignment; 3) given a grade of F in the course; or 4) otherwise penalized, at the discretion of the faculty member. Two occurrences of a WF grade for academic dishonesty will result in the recommendation of the student be expelled from the University, per current University policy as described in the University Catalog. Please reference [AU Student Academic Grievances](#) for further details on student academic grievances.

Student Conduct

If you want more information on conduct expectations, read the Augusta University [Student Code of Conduct](#).

SUPPORT

Technical Support

Your professor may not be able to help you with technical issues. If you need assistance, please contact our IT Help Desk at (706) 721-4000.

Disability Services & Accommodations

Augusta University abides by the Americans with Disabilities Act – Amended (equal and timely access) and Section 504 of the Rehabilitation Act of 1973 (nondiscrimination on the basis of disability). If you have a disability and are in need of academic accommodations but have not yet registered with [Testing & Disability Services](#) (TDS) (Galloway Hall; 706-737-1469) please contact the office as soon as possible for more information and/or to initiate the process for accessing academic accommodations. We also encourage students with disabilities receiving accommodations through TDS to discuss these with us, after class or

during office hours, so that we may be better informed on how to assist you during the semester.

Student Resources

As a student, you have access to free resources that will help you get the most out of your college experience. For more information, go back to the "Content" tab, and visit the "Student Resources" page.