COURSE SYLLABUS:
CYBR 3136 Wireless and Mobile Device Security (Fall 2022)

Some changes may occur to the syllabus during the semester depending on timing and other events that may arise

INSTRUCTOR INFORMATION

Instructor Name	Dr. Linqiang Ge
Email	Ge_linqiang@columbusstate.edu (best way to reach me)
Phone	706-507-8184 (Office)
	706-507-8170 (Department)
Office	CCT 441
Office Hours	Tuesday/Thursday 10-11:00AM, 3-4:30PM
	Monday/Wednesday 10AM-12PM and 1:30-4:30PM (Online)

COURSE INFORMATION

CYBR Cybersecurity Risk Management CRN: 82707

Class Date:	August 16, 2022 (First Class)- November 17, 2022 (Last Class)
Meeting time:	3:00PM - 4:15PM TR
Classroom:	**Synovus Ctr for Commerce Tech 405**

TEXTBOOKS AND MATERIALS

1. Doherty, Jim**. Wireless and Mobile Device Security, Second Edition, Burlington, MA: Jones & Bartlett Learning, 2022 (ISBN 9781284211726)** (**Not Required**)
2. **Security and Privacy in Wireless and Mobile Networks. Free and Available from:** https://directory.doabooks.org/handle/20.500.12854/59094
3. **Demystifying Internet of Things Security. Free and Available from:** https://directory.doabooks.org/handle/20.500.12854/39473

Supplementary Books and Materials:

Title	Author(s)	Year	ISBN
Ethical Hacking Bible: Cybersecurity, Cryptography, Network Security, Wireless Technology and Wireless Hacking with Kali Linux	Hugo Hoffman	2020	979-8640414974
Hackable: How to Do Application Security Right	Ted Harrington	2020	978-1544517674
Hacking with Kali Linux: A Beginner's Guide	Zach Codings	2021	978-1914378041

COURSE DESCRIPTION

This course explores the world of wireless and mobile devices that is evolving day-to-day, with many individuals relying solely on their wireless devices in the workplace and in the home. This course provides step-by-step real-life, advanced scenarios of performing security assessments of wireless networks and how to perform security posture assessments of Internet of Things (IoT) technologies and solutions. The student will learn how to perform security posture assessments of mobile devices, such as smartphones, tablets, and wearables. The course provides the various concepts associated with many different leading-edge offensive security skills, tools and techniques current to the cybersecurity industry.

This course explores wireless network and mobile device security. Students will begin by learning about the history of data networks and the evolution of wired and wireless networking, and review the mobile revolution. Then they will explore wireless local area network (WLAN) design and the operation and behavior of wireless in general, particularly on 802.11 WLANs, along with associated threats and vulnerabilities, various topologies, and devices.

Course Objectives:

The student will be able to:

1. Explain the basic concepts of risk management and the need for risk assessment.
2. Identify compliancy laws, standards, best practices, and policies of risk management.
3. Describe the components of an effective organizational risk assessment program.
4. Describe techniques for identifying and assessing relevant threats, vulnerabilities, and exploits.
5. Identify risk mitigation security controls for controlling network vulnerabilities.
6. Evaluate existing network risk assessment tools.

7. Describe concepts for implementing risk mitigation throughout an organization.
8. Perform a business impact analysis for a provided scenario.
9. Create a business continuity plan (BCP) based on the findings of a given risk assessment for an organization.
10. Create a disaster recovery plan (DRP) based on the findings of a given risk assessment for an organization.
11. Create a Computer Incident Response Team (CIRT) plan for an organization in each scenario.

Course Outcomes:

1. Distinguish wireless standards and technologies and the different wireless authentication mechanisms that exist in the industry.
2. Review wireless client attacks and what motivates threat actors to launch these attacks against victims.
3. Design a lab, reviewing different types of wireless antennas and wireless hacking devices, such as the pineapple.
4. Analyze Wired Equivalent Privacy (WEP) and WPA version 1 and version 2 protocols and discuss the different attacks againstWPA2-PSK networks.
5. Discuss various security posture tools and demonstrate how to use these tools to perform wireless reconnaissance.
6. Review NFC and Bluetooth vulnerabilities and cover different attacks against NFC and Bluetooth implementations and how to mitigate such attacks
7. Survey the fundamentals of IoT technologies and review how to perform security assessments of IoT protocols and implementations
8. Explain different mobile device vulnerabilities that are categorized by OWASP
9. Demonstrate Android security models and explore different Android emulators and software development kits (SDKs)

COURSE ASSESSMENT

LEARNING ACTIVITIES

1. The class will meet for two 75-minute lecture / discussion periods each week.
2. I expect students to come prepared to class and maintain a well-organized record of their own notes. At the very least, students should have read the chapter upon

which the current lecture is based. Participation in class is crucial and is part of the student's final grade. Students are expected to participate the class activities either in-class or online. Students should immediately approach the instructor with any clarification questions they may have.

3. Students must have access to computers for doing assignments.
4. The ACM recommends the following: "As a general guideline, the amount of out-of-class work is approximately three times the in-class time. Thus, a unit that is listed as requiring 3 hours typically entails a total of 12 hours (3 in class and 9 outside)." Students will be expected to spend this time outside class reading the book, online materials, and other materials, writing solutions to homework exercises and programming projects.

COURSE EVALUATION

GRADED LEARNING ACTIVITIES	Points Percentage
Assignments – due on their respective due days no later than 11:59pm Assignments demonstrate the ability of students to assimilate classroom and assigned reading to complete a required task. Assignments will focus on one or more of the learning objectives. Homework assignments are due on CougarView Assignments will normally be graded and returned within 7 days of their due date. Unless untimely submission of an assignment is due to a documented emergency reported to the instructor before the day on which the assignment is due, a penalty of 5% per day will be incurred for late assignments. **Assignments submitted more than 3 days after their due date will be considered missed and will receive a grade of 0.**	24
Labs Lab activities will be finished every Thursday class. The Nelab+ will be used in labs.	16

Quizzes Quizzes evaluate student retention of facts and definitions discussed in class. Quizzes will cover materials presented in class, reading assignments, labs and lectures to determine if students understand the materials and concepts being presented. Quiz test material from the lectures, readings and hands-on exercises. The quizzes may include multiple choice, fill in the blanks, short answer questions and challenge questions. Quizzes will be on CougarView.	8
Group Project Group Project is a method to assimilate all of the previous class work into a single, workable, useful and relevant body of knowledge. The group project will be used to judge student ability to work in a team to understand, assimilate and make practical application of risk management concepts into a workable risk assessment document. Teams will learn management presentation skills by presenting their work through a PowerPoint or poster as well as a final document to be judged on comprehension, thoroughness, format, presentation and individual participation.	20
Midterm and Final Exams Exams, like quizzes, will evaluate student retention of facts and definitions discussed in class and be comprehensive up to the time of the exam. Exams will cover materials presented in class, reading assignments, labs and lectures to determine if students understand the materials and concepts being presented. Midterm and final exams test material from the lectures, readings and hands-on exercises. The exams may include multiple choice, fill in the blanks, short answer questions and challenge questions. If a student misses any exam or are absent for that class, it will NOT be made up unless a makeup is prearranged prior to the date of the exam. **The midterm and Final exams will be in class in Fall 2021.**	30
Class Participation will be considered for students who are on the borderline between two letter grades)	2%
TOTAL	100

NOTE: Some changes may occur to the Evaluation during the semester depending on timing and other events that may arise

Percentage Range	Final Grade	
90-100%	A	- fulfills or exceeds all of the assigned content requirements. - knowledge of the subject is accurate throughout - exhibits convincing range and quality of knowledge, having done appropriate research, if applicable.
80-89%	B	- fulfills all of the important assigned content requirements - knowledge of the subject is accurate throughout except in minor details. - seems informed on the subject, having done appropriate research, if applicable
70-79%	C	- fulfills most of the important assigned content requirements. - knowledge of the subject is generally accurate, though flawed - exhibits limited range or quality of knowledge, having done limited appropriate research, if applicable.
60-69%	D	- fulfills some of the important assigned content requirements - knowledge of the subject is generally accurate, though flawed - exhibits limited range or quality of knowledge, having done minimal appropriate research, if applicable.
59% and below	F	- fails to address the important requirements of the course. - knowledge of the subject is generally inaccurate and/or lacks range or quality

COURSE AND INSTITUTIONAL POLICIES

Title IX Discrimination

Under Title IX of the Education Amendments of 1972, harassment based on sex, including non-consensual sexual contact, stalking, sexual exploitation, domestic and dating violence, and harassment because of pregnancy or related conditions, is prohibited. If a student would like to file a complaint for Title IX discrimination or has any questions, please contact the CSU Title IX Coordinator (Lauren A. Jones, J.D. 4225 University Avenue, Schuster 221, Columbus, GA 31907, jones_lauren3@columbusstate.edu, 706.507.8757) and/or the Office of Civil Rights (Atlanta Office, U.S. Department of Education, 61 Forsyth Street S.W., Suite 19T10, Atlanta, GA 30303-8927, 404.974.9406, OCR.Atlanta@ed.gov).

CougarVIEW (D2L Brightspace) Accessibility Information

From the D2L website: "At D2L we believe learning technologies should never limit learning opportunities. Our accessibility program is tightly integrated with our research and development lifecycle to ensure our tools are standards compliant and easy for people to navigate and understand using the assistive technologies and devices that support their needs... At Desire2Learn we use WAI guidelines, such as the Web Content Accessibility Guidelines 2.0 (WCAG 2.0), Authoring Tool Accessibility Guidelines 2.0 (ATAG 2.0) and Accessible Rich Internet Applications Suite (WAI-ARIA) to ensure our designs are consistent with international objectives." For more information go to D2L Accessibility.

CSU Social Distancing and Attendance Statement

Students and faculty are expected to remain socially distanced during the course of the pandemic. For courses that are designated for face-to-face or hybrid delivery, it is advised that information sharing should occur electronically. For safety, while physically present, all individuals should remain 6+ feet apart at all times. Unless otherwise necessary, syllabi and other educational materials should be provided via CougarVIEW, email, or other remote medium. Remote activities are necessary, as it is possible that a move to fully online instruction may be required before this course is completed.

The University System of Georgia (USG) requires all faculty, staff, students, and visitors to wear an appropriate face covering while inside campus facilities/buildings. Face covering use will be in addition to and is not a substitute for social distancing. All classrooms will be set up in adherence to physical distancing guidelines. While certain lab and studio courses may not meet the 6-feet recommendation, students and faculty are required to wear face coverings and adhere to the necessary sanitation requirements for the lab or studio space.

Anyone not using a face covering when required will be asked to wear one or must leave the area. Repeated refusal to comply with the face mask requirement may result in disciplinary action through the applicable conduct code found in the Student Handbook and Community Guide.

Any student asked to leave will be counted absent for that class period. Reasonable accommodations may be made for those who are unable to wear a face-covering for documented health reasons. Please notify your instructor immediately if you require a face-covering accommodation.

If you are not able to attend class due to illness, please send an email to indicate that you will be absent. In lieu of attending class, you may access the course materials through CougarVIEW, and participate remotely until such time that you are able to return to class. Please keep me informed on your ability to

return to class, in accordance with CDC guidelines, as it is important for me to know when to expect you in-person.

ADMINISTRATIVE POLICIES AND ACADEMIC RESOURCES

ADA AND 504 STATEMENT

If you have a documented disability as described by the Americans with Disabilities Act (ADA) and the Rehabilitation Act of 1973, Section 504, you may be eligible to receive accommodations to assist in programmatic and/or physical accessibility. We recommend that you contact the Center for Accommodation and Access located in Schuster Student Success Center, Room 221, 706-507-8755 as soon as possible. The Center for Accommodation and Access can assist you in formulating a reasonable accommodation plan and in providing support. Course requirements will not be waived but accommodations may be able to assist you to meet the requirements. Technical support may also be available to meet your specific need.

ACADEMIC INTEGRITY

All students are expected to recognize and uphold standards of intellectual and academic integrity. As a basic and minimum standard of conduct in academic matters that students be honest and that they submit for credit only the products of their own efforts. Both the ideals of scholarship and the need for fairness require that all dishonest work be rejected as a basis for academic credit. They also require that students refrain from all forms of dishonorable or unethical conduct related to their academic work.

Students are expected to comply with the provisions of Section III, "Student Responsibilities," of the Columbus State University Student Handbook. This specifically includes the sections on "Academic Irregularity," and "Conduct Irregularity." In particular, the Columbus State University Student Handbook states:

"No student shall give or receive assistance in the preparation of any assignment, essay, laboratory report, or examination to be submitted as a requirement for any academic course in such a way that the submitted work can no longer be considered the personal effort of the student submitting the work."

Examples of Academic Dishonesty include but are not limited to: Plagiarism (see definition below), giving or receiving unauthorized assistance on exams, quizzes, class assignments or projects, unauthorized collaboration, multiple submissions (in whole or part) of work that has been previously submitted for credit.

Plagiarism is any attempt to represent the work or ideas of someone else as your own. This includes purchasing or obtaining papers from any person and turning them in as your own. It also includes the use of paraphrases or quotes from a published source without properly citing the source. All written assignments may be submitted for textual similarity review to Turnitin.com for the detection of plagiarism.

Any work turned in for individual credit must be entirely the work of the student submitting the work. All work must be your own. You may share ideas but submitting identical assignments (for example) will be considered cheating. You may discuss the material in the course and help one another with debugging, however, I expect any work you hand in for a grade to be your own. A simple way to avoid inadvertent plagiarism is to talk about the assignments, but do not read each other's work or write solutions together. Keep scratch paper and old versions of assignments until after the assignment has been graded and returned to you. If you have any questions about this, please see me immediately.

For assignments, access to notes, textbook, books, and other publications is allowed. Stealing, giving or receiving any code, diagrams, drawings, text or designs from another person (CSU or non-CSU) is not allowed. Having access to another person's work on the system or giving access to your work to another person is not allowed. It is your responsibility to keep your work confidential.

No cheating in any form will be tolerated. Please be aware that anyone caught cheating or plagiarizing in this class will receive a "0" for the assignment/exam and may receive an F for the course.

See https://cs.columbusstate.edu/resources/academic-dishonesty-policy.php for more details.

COURSE ATTENDANCE POLICY

You are responsible for all class work missed, regardless of the reason for the absence(s). Late assignments will be graded as described in the Graded Learning Activities section. If you are absent on the day an assignment is due, it is your responsibility to make alternate arrangements. Refer to the CSU Catalog for more information on class attendance and withdrawal.

ELECTRONIC DEVICES

All cell phones and pagers must be turned off prior to entering the classroom or lab. The use of any electronic device during a test or quiz is prohibited. This includes cell phones, handheld calculators,

iPhones, Android phones, PalmPilots, Blackberrys, PocketPCs, and laptops. Any use of such a device during a test or quiz will be considered a breach of academic integrity.

TECHNICAL RESOURCES

SOFTWARE REQUIREMENTS

• An office suite such as Microsoft Office or Open Office
• To open PDF files you might need Acrobat Reader
• Browser Plugins (Pdf files, QuickTime files, Mp4 files) can be usually be obtained at the browser's website.
• Google Chrome Firefox
• Safari
• Internet Explorer (Caution: IE is often problematic for D2L-CougarVIEW)

If you need technical support or need assistance configuring your computer, you can refer to the link located in the "Support Resources" widget located on your "My Home" and your "Course Home" pages. If you cannot solve your problem after reviewing the knowledge base help pages, you can call help center 24-7 and talk to a Help Center agent. The number is 1-855-772-0423.

COLLEGE SPECIFIC SECTION

TUTORING LAB

Student assistants in the public Computer Center labs / Library can help you with basic computer-related problems such as logging on to the network, saving your work, etc., but they are not obligated to help you with your assignments. There are several tutors in the School of Computer Science lab (CCT450) who can help you with the assignments. Their schedule is posted in the Computer Science School. You can always contact me during my posted office hours, by e-mail, or by appointment.

DISCUSSION ETIQUETTE

CSU is committed to open, frank, and insightful dialogue in all of its courses. Diversity has many manifestations, including diversity of thought, opinion, and values. Students are encouraged to be respectful of that diversity and to refrain from inappropriate commentary. Should such inappropriate comments occur, I will intervene as I monitor the dialogue in the discussions. I will request that inappropriate content be removed from the discussion and will recommend university disciplinary action

if deemed appropriate. Students as well as faculty should be guided by common sense and basic etiquette. The following are good guidelines to follow:

• Never post, transmit, promote, or distribute content that is known to be illegal.

• Never post harassing, threatening, or embarrassing comments.

• If you disagree with someone, respond to the subject, not the person.

Never post content that is harmful, abusive; racially, ethnically, or religiously offensive; vulgar; sexually explicit; or otherwise potentially offensive.

HOW TO ACCESS THE COURSE

You can access the course through CougarView at: http://colstate.view.usg.edu/

At this page, select the "Log on to" CougarView link to activate the CougarView logon dialog box, which will ask for your CougarView username and password. Your CougarView username and password are the same as your CougarNet username and password:

Username: lastname_firstname

Password: XXXX

Default password is your birthday in the format of DDMMYY.

If you try the above and CougarView will not let you in, please use the "Comments/Problems" link on the CougarView home page to request help. If you are still having problems gaining access a day or so after the class begins, please e-mail me immediately.

Once you've entered CougarView, you will see a list of courses you have access to. The CYBR 3106 course is listed as "Cyber Security Risk Assessment". You may also see new calendar postings, and new mail messages. Clicking on the name of the course will take you to the course's home page. If you do not see the "Cyber Security Risk Assessment" course in the list, please e-mail me immediately.

Once you have clicked on the course's name and accessed the particular course itself, you will find a home page with links to other sections and tools, and a menu on the left-hand side. Feel free to explore the areas in the course.

COURSE WEBSITE

It is your responsibility to frequently look at the course's CougarVIEW website to keep your knowledge of class activities current. I may occasionally forget to announce details in class, but they may have been already posted in CougarVIEW. If so, you will still be held responsible for them. For example, assignment due dates, corrections of errors, announcements, exam dates, changes to policies, and so on. Students are responsible for keeping pace with the progress of the course. Should any concerns about the course's contents be addressed, students should immediately consult with the instructor by email or during office hours. In addition to regularly reading from the textbook, students must visit the course's website at least once a day for recent updates and announcements. Students must regularly check both their CSU and their CougarVIEW email accounts for messages from the instructor. Announcements made on CougarVIEW, and that are at least 24 hours old, will be assumed to have been read by their recipient(s).

"I didn't know" is not excuse for not submitting an assignment in time or for not
having read an email/announcement from the instructor.

STUDENT RESPOSIBILITIES

As a student in this course, you are responsible to:

- manage your time and maintain the discipline required to meet the course requirements,
- come to class prepared to ask questions to maximize your understanding of the material,
- complete all readings,
- complete all assignments,
- complete all exams, and
- read any e-mail sent by the instructor and respond accordingly.

INSTRUCTOR RESPONSIBILITIES

As your instructor in this course, I am responsible to:

- lead the class discussion and answer students' questions,
- actively participate in discussions when necessary,
- respond to students questions and concerns,
- grade assignments and exams, and post scores within one week of the end of the week in which they are submitted, and
- read any e-mail sent by the you and respond accordingly within 24 hours.

ABET Criteria:

Students in CS/IT will have a(n):

A. ability to apply knowledge of computing and mathematics appropriate to the discipline.
B. ability to analyze a problem, and identify and define the computing requirements

appropriate to its solution.

C. ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs.

D. ability to function effectively on teams to accomplish a common goal.

E. understanding of professional, ethical, legal, security, and social issues and responsibilities.

F. ability to communicate effectively with a range of audiences.

G. ability to analyze the local and global impact of computing on individuals, organizations and society.

H. recognition of the need for, and an ability to engage in, continuing professional development.

I. ability to use current techniques, skills, and tools necessary for computing practice.

J. ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.

K. ability to apply design and development principles in the construction of software systems of varying complexity.

CS Program Objectives:

Our graduates will have achieved:

- A broad general education assuring an adequate foundation in science and mathematics relevant to computing.

- A solid understanding of concepts fundamental to the discipline of computer science.
- Good analytic, design, and implementation skills required to formulate and solve computing problems.

The ability to function and communicate effectively as ethically and socially responsible computer science professionals.

TENTATIVE SCHEDULE

Course textbook: Wireless and Mobile Device Security, Second Edition (Doherty, 2022)

Week	Date	Topic	Learning Activity/Assessment
1	August 16	Welcome and Introduction Computer Networks Review	Post to " Introduce Yourself" discussions post Complete "Getting to Know Quizzes" quiz assessment

Week	Date	Topic	Learning Activity/Assessment

2	August 23	The Evolution of Data, Wireless, and Mobile Networks	Assignment 1: The Evolution of Mobile Technologies
3	August 30	Anywhere, Anytime, on Anything: "There's an App for That!"	Quiz 1, Lab Activity 1
4	September 6	Security Threats Overview: Wired, Wireless, and Mobile	**Assignment 2**: ELI5 How a Wireless Access Point Works; **Lab 2**
5	September 13	How Do WLANs Work?	Quiz 2 , Lab 3
6	September 20	WLAN and IP Networking Threat and Vulnerability Analysis	**Assignment 3**: Wireless and Mobile Device Threats, **Lab 4**
7	September 27	WLAN Security Measures	**Lab 5**
8	October 4	Midterm Review; **Midterm Exam on October 7**	
9	October 11	WLAN Auditing Tools	**Assignment 4:** Assignment 4: Researching WLAN Auditing Tools, **Lab 6**
10	October 18	WLAN and IP Network Risk Assessment	Group Project Proposal Quiz 3
11	October 25	Mobile Communication Security Challenges	Assignment 5: Security Models
12	November 1	Mobile Device Security Models, and Wireless Attacks and Remediation	Quiz 4
13	November 8	Mobile Malware and Application-Based Threats	Assignment 6: Mobile Phone Security
14	November 17	**Project Presentation**	
15	Nov. 30- Dec. 4	**Final Exam**	Final Project Report