Southern Illinois University
Department of Computer Science
CS 409/CS 591 – Ethical Hacking
Semester Hours: 3
FALL 2023 SYLLABUS

Faculty Information

Dr. Sajedul Talukder
Office: Engineering A0407
Phone: (618) 453-6059
Email: sajedul.talukder@siu.edu
Website: https://www2.cs.siu.edu/~stalukder/

Teaching Assistant
Shalini Donthireddy
(shalini.donthireddy@siu.edu)

TA Office Hours
Wednesday 4-6PM and Friday 10-11AM

Course Information

Course Description
This course aims to help students to learn the principles of computer security and understand how various security attacks and countermeasures work. It provides hands-on experience in playing with security software and network systems, with the purpose of understating real-world threats. Through virtual machine assisted labs and lectures students will be exposed to a variety of security concepts as well as several security vulnerabilities. There are a variety of assignments given throughout the course that will allow for individual and group work. The assignments are set up in a very structured format with a clear display of dates for submission deadlines.

Catalog Description
This course will explore the various means that an intruder has available to gain access to computer resources. We will investigate weaknesses by discussing the theoretical background, and whenever possible, actually performing the attack. We will then discuss methods to prevent/reduce the vulnerabilities.

Course Prerequisites
CS 202 (Intro to Computer Science) with a grade of C or better. Good knowledge of Linux is required.

Course Meeting Days/Times
MWF 11:00-11:50 AM, EGRA 308

Final Exam
Final exam date/time: Dec 11, 2023 - Dec 15, 2023.
**Course Learning Objectives**

On successful completion of CS 409 students should be able to:

- Analyze security vulnerabilities of a network and develop a set of solutions for specific networking scenarios.
- Identify security tools including, but not limited to intrusion detection and firewall software.
- Exhibit an understanding of the threats posed by viruses to networks through the development of appropriate protection plans.
- Find and utilize available online resources as they pertain to developing a secure system.
- Develop comprehensive plans for network security using a full range of available tools.
- Prepare students for Ethical Hacking Certification (CEH) exam.

**Course Materials**


**Course Structure**

**Course Policies/ Procedures/Grading**

Following is a tentative **rough guide** to how course grades will be established, not a precise formula - we will fine-tune cutoffs and other details as we see fit after the end of the course.

Grades will be based on:
- Homework, quiz and assignments: 40%
- Hands on labs/project: 20%
- Midterm exam: 20%
- Final exam: 20%

Grading Scale:
- 93 – 100 A
- 73 – 76 C
Course Assignments

Assessment of students’ knowledge of computer security will be demonstrated via:
- A combination of homework assignments, quizzes, labs, term project and exams.
- Quizzes will be held on random dates.

For assignment submission please include a typed cover sheet with your name, DAWG tag, homework number and undergraduate/graduate level.

Lecture Outline/Schedule (Tentative)

I. Crosscutting Concepts in Cybersecurity
   A. Confidentiality, integrity, availability
   B. Risk
   C. Adversarial thinking
   D. Systems thinking
II. System access and authentication
    A. Basic Cryptographic Concepts
    B. Authentication Methods
    C. Identity
    D. Attacks and mitigation measures
III. Technical foundations of hacking
     A. Reconnaissance
     B. Password cracking and packet sniffing
     C. Session hijacking (man in the middle), denial of service, buffer overflow
     D. Enumeration and system hacking
     E. Malware (viruses, worms)
     F. Web server hacking, web applications, and database attacks
     G. Defense mechanisms (firewall, honeypot)
IV. Connection Security
    A. Introduction to data communications
    B. Network architectures and models
    C. Connection and transmission attacks
V. Human Security
   A. Social engineering
      1. Psychology of Social Engineering Attacks
   B. Awareness and understanding of security issues
      1. System misuse and user misbehavior
      2. Proper behavior under uncertainty
      3. Enforcement and rules of behavior
   C. Privacy
      1. Social and Behavioral Privacy
2. Social Media Privacy and Security

**General Expectations:**

1. This is a 3-semester hour course where the class meets for 3 hours in a week. Students are expected to have access to an internet-connected computer, and have the required level of computer skills, motivation and a commitment to work on their assignments. Course activities might include attending lectures, completing assignments, exams, participating in discussion forums based on prompts from the instructor, and/or responding to questions that have been designed by the instructor to check the understanding of key concepts.

2. If you require accommodations for test-taking due to a disability, please contact the Disability Support Serviced (https://disabilityservices.siu.edu). Please provide the appropriate accommodation documentation during the first week of the semester. You must also provide a test accommodation form for each test in which the accommodation will be required. This documentation should be provided to me at least one week prior to the scheduled exam.

3. All assignments will be given a due date. Students are expected to turn the assignments in by the due date. Late assignments will not be graded!!! There will be no exceptions to this policy. Assignments will be submitted to the associated D2L Assignments file which once closed will no longer accept any assignments.

4. All projects are expected to be done by the individual, unless otherwise directed. Cheating will not be tolerated and will result in a failing grade for the class AND referral to Judicial Affairs. I will entertain NO excuses for cheating!

5. If you are struggling with the material in the class, please make a point to visit me during my office hours or make an appointment to receive additional help. It is not wise to wait until after midterms to try and “rescue” your grade. Establishing a tutoring relationship with anyone during the last week of the semester will be impossible and should not be attempted. Additionally, please do not ask to submit all missing homework assignments at semester end – they must be submitted prior to the due date!

6. If you wish to discuss your grade, please make an appointment or come to see me during office hours. I do not discuss grades over email. **DO NOT REQUEST A GRADE CHANGE ONCE THE FINAL IS OVER.**

7. I will use email to communicate with you about many things outside of the regular class time. It is imperative that you frequently check your email, therefore you are required to check your email regularly and I assume that you receive any email message from me within 12 hours of it being sent. Also, please regularly check your spam folder, as sometimes email from me lands there.

**Academic Integrity:**
It is expected that all work submitted through this course is the student’s original work, generated for the express purpose of completing the requirements of this course. All papers submitted in this course may be screened for originality using Turnitin’s plagiarism detection software. This software checks submissions for text matches, Web content, books including classic works of literature, and newspapers, magazines and scholarly journals.

Students are to be aware that academic dishonesty is not tolerated in this course and should be familiar with the following definitions:

*Cheating.* Behaviors including, but not limited to, use of unauthorized notes or reference materials during examinations; copying answers from another student's paper during an examination; the unauthorized possession of academic materials, including exams; the unauthorized exchange of course assessment materials, including exams; the unauthorized exchange of information or collaboration regarding tests, or other course assignments; aiding another to engage in cheating; and/or all other acts of academic dishonesty that any member of this academic community would reasonably understand to be a breach of this academic integrity statement will be considered cheating and an act of academic dishonesty.

*Plagiarism.* Plagiarism may be defined as the act of taking the ideas and/or expression of ideas of another person and representing them as one's own. This includes, but is not limited to, using ideas or passages from a work without properly attributing the source, paraphrasing the work of another without giving proper credit, and/or the sale, purchase, or exchange of papers or research. It is the student's responsibility to know what plagiarism is and to properly cite the work of others. If a student is in doubt, it is their responsibility to resolve any ambiguity prior to submitting the work. Plagiarism is nothing less than an act of theft, and, as such, is subject to university disciplinary action.
IMPORTANT DATES:

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester Classes Begin</td>
<td>08/21/2023</td>
</tr>
<tr>
<td>Last day to add full-term course</td>
<td>08/27/2023</td>
</tr>
<tr>
<td>Last day to withdraw from the University</td>
<td>09/01/2023</td>
</tr>
<tr>
<td>Last day to drop a full-term course</td>
<td>09/03/2023</td>
</tr>
<tr>
<td>Last day to drop a full-term course (W grade, no refund)</td>
<td>10/29/2023</td>
</tr>
<tr>
<td>Final examinations</td>
<td>12/11-12/15/2023</td>
</tr>
</tbody>
</table>

Note: Please verify the above dates with the Registrar calendar and find more detailed information on deadlines at [http://registrar.siu.edu/calendars](http://registrar.siu.edu/calendars). For add/drop dates that apply to shorter-than-full-term courses, please look at the Schedule of Classes search results at [http://registrar.siu.edu/schedclass/index.php](http://registrar.siu.edu/schedclass/index.php).

FALL SEMESTER HOLIDAYS:

- Labor Day: 09/04/2023
- Thanksgiving Break: 11/18-11/26/2023

DIVERSITY: Southern Illinois University Carbondale’s goal is to provide a welcoming campus where all of our students, faculty, and staff can study and work in a respectful, positive environment free from racism and intimidation. For more information visit: [http://diversity.siu.edu](http://diversity.siu.edu). Additional informational flyer.

DISABILITY SUPPORT SERVICES: SIU Carbondale is committed to providing an inclusive and accessible experience for all students with disabilities. Disability Support Services coordinates the implementation of accommodations. If you think you may be eligible for accommodations but have not yet obtained approval please contact DSS immediately at (618) 453-5738 or [https://disabilityservices.siu.edu](https://disabilityservices.siu.edu). You may request accommodations at any time, but timely requests help to ensure accommodations are in place when needed. Accommodations and services are determined through an interactive process with students and may involve consideration of specific course design and learning objectives in consultation with faculty.

MILITARY COMMUNITY: There are complexities of being a member of the military community and also a student, and military and veteran-related developments can complicate academic life. If you are a member of the military community and in need of accommodations please visit Veterans Services at [http://veterans.siu.edu/](http://veterans.siu.edu/).

STUDENT MULTICULTURAL RESOURCE CENTER: The Student Multicultural Resource Center serves as a catalyst for inclusion, diversity and innovation. As the Center continues its work, we are here to ensure that you think, grow, and succeed. We encourage you to stop by the Center, located in the Student Services Building Room 140, to see the resources available and discover ways you can get involved on the campus. Visit us at [https://smrc.siu.edu/](https://smrc.siu.edu/).

SALUKI CARES: The purpose of Saluki Cares is to develop, facilitate, and coordinate a university-wide program of care and support for students in any type of distress—physical, emotional, financial, or personal. By working closely with faculty, staff, students and their families, SIUC will continue to display a culture of care and demonstrate to our students and their families that they are an important part of the community. For information on Saluki Cares: Call (618) 453-2461, email siucares@siu.edu, or [http://salukicares.siu.edu/](http://salukicares.siu.edu/).

SAFETY AWARENESS FACTS AND EDUCATION: Title IX makes it clear that violence and harassment based on sex and gender is a Civil Rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, etc. If you or someone you know has been harassed or assaulted, you can find the appropriate resources here: [http://safe.siu.edu](http://safe.siu.edu).

SIU COUNSELING AND PSYCHOLOGICAL SERVICES (CAPS): Mental health counseling services are available by calling CAPS at (618) 453-5371. CAPS offers confidential same-day services and ongoing counseling. For after-hours crisis care, students are encouraged to call 988, 911, or present to their nearest emergency room.

WITHDRAWAL POLICY (Undergraduate Only): Students who officially register for a session must officially withdraw from that registration in a timely manner to avoid being charged as well as receiving a failing grade for those classes. An official withdrawal must be initiated by the student, or on behalf of the student through the academic unit, and be processed by the Registrar’s office. For the proper procedures to follow when dropping courses and when withdrawing from SIUC visit: [http://registrar.siu.edu/students/withdrawal.php](http://registrar.siu.edu/students/withdrawal.php).

SIUC’S EARLY WARNING INTERVENTION PROGRAM (EWIP): Students enrolled in courses participating in SIUC’s Early Warning Intervention Program might be contacted by University staff during a semester. More information can be found at the University Core Curriculum’s Overview webpage: [https://corecurriculum.siu.edu/for-faculty/](https://corecurriculum.siu.edu/for-faculty/).

EMERGENCY PROCEDURES: We ask that you become familiar with Emergency Preparedness at SIU. Emergency response information is available on posters in buildings on campus, on the Emergency Preparedness at SIU website, and through text and email alerts. To register for alerts visit: [http://emergency.siu.edu/](http://emergency.siu.edu/).

CATALOGS:
- [catalog.siu.edu](http://catalog.siu.edu)
- [gradcatalog.siu.edu](http://gradcatalog.siu.edu) - Graduate policies often vary from Undergraduate policies. To view the applicable policies for graduate students, please refer to the graduate catalog.

CENTER FOR LEARNING AND SUPPORT SERVICES:
- Tutoring: [https://clss.siu.edu/](https://clss.siu.edu/)

WRITING CENTER: [http://write.siu.edu/](http://write.siu.edu/)

PLAGIARISM: See the Student Conduct Code: [http://srr.siu.edu/student-conduct-code/](http://srr.siu.edu/student-conduct-code/)


REPEAT POLICY: [http://registrar.siu.edu/students/repeatclasses.php](http://registrar.siu.edu/students/repeatclasses.php)

MORRIS LIBRARY HOURS: [https://libcal.lib.siu.edu/hours/](https://libcal.lib.siu.edu/hours/)

ADVISEMENT: [http://advisement.siu.edu/](http://advisement.siu.edu/)

SIU ONLINE: [https://online.siu.edu/](https://online.siu.edu/)

Need additional help with an issue? Visit SALUKI SOLUTION FINDER at [http://solutionfinder.siu.edu/](http://solutionfinder.siu.edu/)

MISSION STATEMENT FOR SOUTHERN ILLINOIS UNIVERSITY CARBONDALE

SIU embraces a unique tradition of access and opportunity, inclusive excellence, innovation in research and creativity, and outstanding teaching focused on nurturing student success. As a nationally-ranked public research university and regional economic catalyst, we create and exchange knowledge to shape future leaders, improve our communities, and transform lives.