

Spring 2024

## CS 698-002: Special Emerging Topics

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# Syllabus for CS/IS 698 (Spring 2024)

*This is the official course syllabus. You can find [its latest version](#) as well as most of the same information in a more accessible format elsewhere on [the course website](#).*

## **Course information**

### **Course number**

IS/CS 698

The CRN for the IS section of this course is 15977; for CS it's 15978.

### **Course title**

Human Factors in Security & Privacy

## **Detailed description**

When real-world cybersecurity incidents occur, the root cause is often not the technology on its own but the way people interact with it. Understanding and accounting for these human factors is crucial if we want to achieve meaningful security and privacy. This course will cover a range of user-interface and human-computer interaction problems experienced by real users. It will teach a variety of empirical research methods for evaluating the usable security properties of systems, as well as techniques for designing systems to avoid usability issues. In addition to learning from the latest research in the field of human-centered security, students will have many opportunities to gain hands-on experience applying methods from the literature, culminating in a major research and development project that students can add to their portfolios.

## Prerequisites

### Required

The following knowledge and skills are required for success in this course.

### Computer and network security

#### Concepts

Students should have a strong understanding of computer and network security concepts including:

- Network security
  - Example: How does the TLS protocol work?
- Encryption
  - Example: How do different block cipher modes of operation work?
- Memory safety
  - Example: How does a buffer overflow happen and what protections exist against it and similar attacks?
- Web security
  - Example: How does FIDO U2F protect against phishing?

#### Suggested courses

*Any* of the following courses will likely provide the necessary background:

- IT 230. Computer and Network Security
- CS 351. Introduction to Cybersecurity
- CS 608. Cryptography and Security
- CS 645. Security and Privacy in Computer Systems
- Equivalent courses at other institutions
- Equivalent computer security experience

## **Programming and software development experience**

### Concepts

- Students should be comfortable completing programming tasks using unfamiliar programming languages and APIs
  - Example: use the [Web Permissions API](#) to request access to a certain resource
- A large component of the course is a semester-long project that is likely to feature significant programming components. Students should be prepared to undertake these tasks.
  - Examples:
    - \* Create a mobile app
    - \* Implement a prototype of an interface
    - \* Perform data analysis and compute statistics

### Suggested courses

- IS 513. Programming Foundations for IS
- Undergrad major in computer science
- Equivalent computer programming experience

## **Recommended**

The following experiences and background are not required, but students who have them may get more out of the course.

## **User experience research or design**

### Concepts

- Experience designing and/or evaluating user interfaces

### Suggested courses

- IS 661. User Experience Design

## Statistics

### Concepts

- Experience selecting and calculating statistics
  - Examples:
    - \* t-tests
    - \* ANOVA
    - \* Regressions
    - \* Bootstrapping

### Suggested courses


- IS 333. Probability and Statistics

## Learning outcomes

Students completing this course will:

- Learn concrete instances of security and privacy failures in common technologies
- Be able to explain how human factors contributed to these issues
- Read and understand current research in usable privacy and security
- Learn and practice methodologies for evaluating the usability of systems
- Be able to practice human-centered design for security and privacy systems

## Meeting-by-meeting outline

 Subject to change

Please keep in mind that the schedule may change as the course progresses, so please regularly check the course website for any changes.

Week	Day	Date	Class	Lecture	Discussion	Reading	Due
0	Thu	1/18	1	- <a href="#">Usable security overview</a>	Security	<i>None</i>	

Week	Day	Date	Class	Lecture	Discussion	Reading	Due
1	Mon	1/22	2	- <b>Privacy and context</b>	Privacy mental models	- <b>(Optional)</b> Renaud et al. <i>Why Doesn't Jane Protect Her Privacy?</i>	
	Thu	1/25	3	- Introduction to usability		<i>None</i>	H1: ethics
2	Mon	1/29	4	- Usable encryption- Methods: cognitive walk-throughs	- Usable encryption	Whitten and Tygar, <i>Why Johnny Can't Encrypt</i>	P1: project ideas
	Thu	2/1	5		- Passwords	Ur et al., "I Added '!' at the End to Make It Secure": Observing Password Creation in the Lab	

Week	Day	Date	Class	Lecture	Discussion	Reading	Due
3	Mon	2/5	6	- Methods: user studies	- Reflec- tions: cognitive walkthroughs	Reese et al., <a href="#">A Usability Study of Five Two- Factor Authenti- cation Methods</a>	<a href="#">P2: project groups</a>
	Tue	2/6			Two- factor authentication Password alterna- tives		<a href="#">H2: cognitive walk- through</a>
	Thu	2/8	7	- Methods: inter- views	Authorization / access control	<i>TBA</i>	
4	Mon	2/12	8	- Methods: qualita- tive analysis	Mobile permis- sions	<i>TBA</i>	
	Tue	2/13					<a href="#">P3: project proposal</a>
	Thu	2/15	9		- Project feedback- Phishing preven- tion	<i>TBA</i>	
5	Mon	2/19	10	- Methods: surveys	Security warnings and indi- cators	<i>TBA</i>	
	Tue	2/20					<a href="#">H3: user study</a>

Week	Day	Date	Class	Lecture	Discussion	Reading	Due
	Thu	2/22	11	- Methods: statistics	- Reflec- tions: user study- Breach and com- pliance notifica- tions	<i>TBA</i>	
6	Mon	2/26	12	- Methods: experi- ment design and validity	Privacy in social media	<i>TBA</i>	
	Tue	2/27					P4: project methods
	Thu	2/28	13		Privacy policies	<i>TBA</i>	
7	Mon	3/4	14		Online tracking	<i>TBA</i>	
	Tue	3/5					H4: interview
	Thu	3/7	15		- Reflec- tions: interview- Usable anonymity	<i>TBA</i>	
8	Mon	3/11		<b>Spring Break</b>			
	Thu	3/14		<b>Spring Break</b>			
9	Mon	3/18	16	- How-to: writing a paper (overview)	Smart home privacy	<i>TBA</i>	



Week	Day	Date	Class	Lecture	Discussion	Reading	Due
	Thu	3/21	17	- How-to: writing related work	AR/VR privacy	<i>TBA</i>	
10	Mon	3/25	18	- How-to: writing methods section	Deceptive design patterns	<i>TBA</i>	
	Tue	3/26					H5: survey
	Thu	3/28	19	- How-to: writing results	- Reflections: survey-Security professionals	<i>TBA</i>	
11	Mon	4/1	20	- How-to: writing the discussion	Software developers	<i>TBA</i>	P5: project progress report
	Tue	4/2					P6: project related work
	Thu	4/4	21	- How-to: writing the introduction	Vulnerable populations	<i>TBA</i>	
12	Mon	4/8	22		<i>Project work period</i>		
	Tue	4/9					H6: design exercise
	Thu	4/11	23		Accessibility	<i>TBA</i>	
13	Mon	4/15	24		Children and teens	<i>TBA</i>	
	Thu	4/18	25		Older adults	<i>TBA</i>	

Week	Day	Date	Class	Lecture	Discussion Reading	Due
14	Mon	4/22	26	- How-to: giving a research talk	International & multi-cultural perspectives	TBA
	Thu	4/25	27		<i>Project work period</i>	
15	Mon	4/29	28	Final project presentations		
	Thu	5/2			<i>Reading day</i>	
16	Mon	5/6			<i>Exam week</i>	P7: project final report
	Thu	5/9			<i>Exam week</i>	

## Grading

### Grade weights

Current events assignment	5%
Reading responses	5%
In-class presentations	10%
Project	45%
P1: ideas	1%
P2: group	1%
P3: proposal	5%
P4: methods	5%
P5: progress report	3%
P6: related work	5%
P7: presentation	5%
P8: report	10%
overall project quality and participation	10%
Homework	30%

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	H1: ethics	5%
	H2: cognitive walkthrough	5%
	H3: user study	5%
	H4: interview	5%
	H5: survey	5%
	H6: design	5%
Participation		5%

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### **Late policies**

Each assignment will specify its own late policy.

### **Grading scale**

The course will be graded using the standard absolute scale, converting numerical scores to letter grades; i.e., this course is not curved.

### **Instructor information**

[Nathan Malkin](#)

### **Office hours**

There will be two types of office hours in this course. Both will be held in **GITC 3803**.

### **Open office hours**

These will be **Thursdays, 2–3 PM**.

- These are unscheduled, so please come without any prior notice.
- If multiple people show up, I will try to accommodate everyone, for example by answering questions in a group or focusing on topics that the plurality of those in attendance are interested in.
- If you have a question about course topics or assignments or anything else you think might be of interest to others, please try to come to these office hours.

## **Individual office hours**

These will be **Mondays, 2–3 PM**, in 15-minute slots.

To reserve a slot, [follow this link](#).

- These office hours are for questions you're more comfortable discussing one-on-one, such as grading issues, career advice, etc.
- I'll prioritize anyone who has a reservation, but if a slot is unscheduled, I'll treat it like the open office hours above (so come on by!).

## **Course materials**

### **Required**

No required textbooks. All required readings will be linked from the course website.

### **Optional**

Any optional readings will be linked from the course website.

## **Examination details**

This course will not have midterms or a final exam.

## **Make-up exam policies**

N/A

## **Course, department, and university policies**

### **Collaboration policy**

Except where otherwise noted, submitted assignments must be completed individually. You may discuss the topics and materials with other students, but any write-up you submit must be fully and completely your own work.

If you're not sure whether something would be considered acceptable collaboration, please proactively contact the course staff.

## **Course policy on the use of artificial intelligence**

AI tools can be very helpful, but they come with many flaws and limitations. In the context of this course, I believe that the use of AI tools will hurt rather than help the educational objectives, and therefore the use of AI tools is **discouraged**.

If you choose to use an AI tool, you must clearly specify which one, how it was used, and specifically identify its outputs and other contributions in any work you submit. You are responsible for the correctness of your work and are therefore expected to take steps to verify that you are not including or citing any hallucinated information. Failure to follow this policy will be treated as a violation of academic integrity.

Because programming and algorithms are not the focus of this course, there are no restrictions on the use of AI tools for software development (for example if you develop a prototype for your final project).

If you're not sure whether something would be considered acceptable use, please proactively contact the course staff.

## **If you're sick**

If you're not feeling well, please stay home. You're likely to feel better more quickly, and you'll be protecting everyone from getting infected. Please reach out to your peers for class notes or, if those are not available, contact me. If you do choose to come to class while not feeling 100%, then please wear a well-fitting N95 or KN95 mask. Please keep in mind that everyone responds to illness differently, and what for some can be a simple cold can manifest in others as serious medical issues. Thank you for protecting your peers and me!

## **Mental health and wellness**

The academic environment can be stressful. Your well-being should always come first. NJIT's [Center for Counseling and Psychological Services](#) offers a variety of resources. Please reach out to them if you need to, and I will do my best to support you with appropriate accommodations.

## **Academic integrity**

*“Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: [NJIT Academic Integrity Code](#).”*

*Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at [dos@njit.edu](mailto:dos@njit.edu)*

### **Class recordings**

*“Class sessions may be recorded by the instructor. These recordings shall only be used as an educational resource and are not to be distributed or used outside of this class. Information on how to access recorded lectures will be made available by your instructor. Any recordings that contain identifiable information about students will not be used beyond this semester.*

*Students are expected to respect their fellow students’ privacy and freedom to learn without disruption. Students are not allowed to capture or reproduce anyone’s name, image, or voice without permission. They must be polite and respectful in the online chat. Informal chat is okay, but typing is restricted to things that one would say out loud in front of the entire class. Students must always conduct themselves on their webcam video as they would in person in a classroom.”*

### **Extenuating circumstance & other situations**

*“When a student invokes extenuating circumstances for any reason (late withdrawal from a course, request for a make-up exam, request for an Incomplete grade, request for accommodation due to illness) the student should be referred to the Dean of Students Office. The Dean of Students will make the determination of whether extenuating circumstances exist and will notify the instructor accordingly. Instructors should never request or accept medical or other documents from students; all documents should be submitted by the student to the Dean of Students Office. Except for cases determined by law, an instructor is not required to accommodate student requests even when extenuating circumstances are certified by the Dean of Students; however, all efforts should be made to ensure a student-friendly environment.”*

### **Sexual discrimination or harassment**

According to federal and university [Title IX policy](#), all instructional staff are “required to report any Prohibited Conduct involving students to the Title IX Coordinator that they witness or become aware of.”

*“Any observed, experienced or known discrimination on the basis of sex, gender identity, or sexual orientation, including the following forms of sexual harassment: sexual violence, dating*

*violence, domestic violence and stalking involving any member of our university community, must be reported.”*