Human-centered Cybersecurity

Course description

Cybersecurity is fundamentally a problem of human interaction with technology, but its technical challenges are better understood than its human challenges. This course is designed to give you an overview of human interactions with cybersecurity technology, from users to system designers. Using the information gleaned in this course, you should be able to make better predictions about how people react to cybersecurity policies and tools, and how those reactions shape organizational behavior. The earlier part of the course focuses on explanations for behavior, while the later parts of the course focus more on the development and evaluation of tools for assisting people in cybersecurity.

This course is a seminar, and it will involve discussion both online and in class. I will provide some suggested readings, but I will also expect you to look for information on the topics on your own to answer the discussion questions.

Learning Objectives

Upon completion of the course, you should be able to:

1. Map frameworks for understanding human behavior to cybersecurity situations
2. Generate hypotheses about what people will do in specific cybersecurity contexts
3. Design cybersecurity tools and policies based on predicted human behavior
4. Evaluate the consequences of cybersecurity tools and policies based on predictions about human behavior
5. Analyze ethical and equity issues in use of cybersecurity technologies

Required Resources

Course website: https://umd.instructure.com/courses/1271054
Required readings will be available from University Libraries or online sources. If they are not available or findable, please let me know.

Dr. Susan G. Campbell
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she/her

Class meets
Tuesday/Thursday
3:30 PM – 4:45 PM
EGR 3106

Office hours
Tuesday/Thursday
1:30 PM – 2:30 PM
PTX 1109G

Prerequisite:
INST 201/301

Course communication
I will announce any changes to the syllabus or other important information on ELMS. You may choose to have such announcements sent to you in your preferred manner through the ELMS interface.

To contact me, please send me an email at the address above and I will get back to you within 24 hours. If the communication is less urgent, feel free to message me on ELMS.

Expectations and grading procedures

Composition of percentage grades

Class participation and in-class assignments: 10%

This mark assesses attendance and engagement with in-class activities. I expect you to come to class prepared, having done any assigned reading and exercises, and I may ask you questions either orally or in short in-class writing assignments.

Homework and online discussion: 10%

There will be online discussion questions posted throughout the semester. More than one question may be posted in a week. You will be evaluated on your participation in those discussions. The lowest two of these discussion grades will be dropped.

Discussion questions may cover upcoming topics or summarize prior topics. On each discussion, you are expected to provide both an initial response to the question and a response to a fellow student's point. Responses should be at least a paragraph. You may use information from as many outside sources as you like, as long as you cite those sources in your response (for instance, by providing the URL of the source article). If you attach images, please make sure they have appropriate alt-text.

Mid-term exams: 15% each

There will be two take-home mid-term exams on ELMS, with a 2-hour time limit each. They may cover any course material.

Final exam: 20%

The final exam will be take-home with a 3-hour time limit and will be due at the university-scheduled time. It may cover any material from the course.

Final paper/project: 30%

You will work on multiple components of a project, which may be a programming project or paper on a topic of your choice, throughout the semester. I will provide a project/paper assignment by the first exam. The components will be scored separately, and the component scores will sum to 30%.

Converting percentage grades to letter grades

I follow the standard practice in converting percentage grades to letter grades, as listed in the table below.

Percentage	Letter	Points
97+	A+	4.0
94-96	A	4.0
90-93	A-	3.7
87-89	B+	3.3
84-86	B	3.0
80-83	B-	2.7
77-79	C+	2.3
74-76	C	2.0
70-73	C-	1.7
67-69	D+	1.3
64-66	D	1.0
60-63	D-	0.7
<60	F	0.0

Course procedures and policies

This syllabus is subject to change. I will notify you in advance of important changes that could affect grading or assignments.

It is our shared responsibility to know and abide by the University of Maryland's policies that relate to all courses, which include topics like:

- Academic integrity
- Student and instructor conduct
- Accessibility and accommodations
- Attendance and excused absences
- Grades and appeals
- Copyright and intellectual property

Please visit www.ugst.umd.edu/courserelatedpolicies.html for the Office of Undergraduate Studies' full list of campus-wide policies and follow up with me if you have questions. Policies that are specific to this course are listed here.

Attendance and absences

This class is structured as a seminar, and I expect you to prepare for, attend, and participate in each class meeting, both for your benefit and for the benefit of your classmates. Please inform me in advance of absences if possible. Prolonged absence from class may affect both your understanding of the material and your participation grade.

If you are going to miss an exam due to an unavoidable obligation, please inform me in advance so that we can schedule an earlier exam date. If you miss an exam due to a medical issue, please provide me with a note from a doctor or a self-signed note. I will provide a make-up exam if necessary.

Late assignments

I expect you to turn assignments in on time. If you must turn an assignment in late for a reason that is not covered by the excused absence policy and you have not arranged with me to turn it in late, I will take off 10% per day that the assignment is late. Discussion questions will receive no credit, as the lowest two discussion questions are dropped already.

Academic integrity

This course is designed to be collaborative; you are welcome to discuss any assignment with your classmates, but if an assignment is not explicitly listed as a group effort, you are expected to produce your own final product. For exams, you may collaborate on study materials, but you are expected to answer exam questions on your own. If you have questions about this distinction, please let me know.

You are welcome to use outside sources for discussions and even for exam questions (although the exams are designed to be answered without outside sources). You must cite your sources, however. Please do not quote directly from the lecture notes – I want to know that you have understood the material, not that your notes have a good indexing system.

I take academic dishonesty very seriously, and work that is not your own does not demonstrate the understanding necessary to count for an assignment. If you are unsure if something is appropriate, please ask.

The student-administered Honor Code and Honor Pledge prohibit students from cheating on exams, plagiarizing papers, submitting the same paper for credit in two courses without authorization, buying papers, submitting fraudulent documents and forging signatures. On every examination, paper or other academic exercise not specifically exempted by the instructor, students must write by hand and sign the following pledge:

I pledge on my honor that I have not given or received any unauthorized assistance on this examination (or assignment).

Allegations of academic dishonesty will be reported directly to the Student Honor Council: http://www.shc.umd.edu

Writing center

To help you with writing assignments, peer consultants are available in the Writing Center, 1205 Tawes Hall. The consultants can help you with all aspects of your writing process, from generating ideas to organizing your thoughts to revising your prose. Check the website for current semester hours. Daytime hours include both appointments and walk-in (call 301-405-3785 for a 30 or 60 minute appointment), while evening hours are walk-in only. To make an appointment, go to umd.mywconline.com. The Writing Center also maintains limited walk-in hours in 2101 McKeldin Library.

Copyright notice

Class lectures and other course materials are copyrighted and may not be reproduced for anything other than your personal use without the permission of the course instructor. Course materials are the property of the course instructor – do not sell them, do not post them on a website. Be aware that copyright infringements may be referred to the Office of Student Conduct.

As a student, you own the work that you create as part of your University academic and research activities. Sending a copy of your work to your instructor does not mean that they have the right to repost that work elsewhere or use it without your permission.

Emergency protocol

If UMD is closed for an extended period of time, the class will be conducted online using ELMS.

Course evaluations

Course evaluations are a part of the process by which the University of Maryland seeks to improve teaching and learning. Your participation in this official system is critical to the success of the process, and all information submitted to CourseEvalUM is confidential. (Instructors can only view group summaries of evaluations and cannot identify which submissions belong to which students.)

Sexual misconduct

By university policy, I must report any sexual misconduct directed at or perpetrated by a student that I hear about to the university. Sexual misconduct does not just cover assault, and includes such things as stalking, threats of assault, and covert creepy photography. (Sadly, I cannot report all of Twitter.) Please keep that in mind.

The University of Maryland is committed to providing support and resources, including academic accommodations, for students who experience sexual or relationship violence (as defined by the University's Sexual Misconduct Policy). To report an incident and/or obtain an academic accommodation, contact the Office of Civil Rights and Sexual Misconduct at 301-405-1142. If you wish to speak confidentially, contact Campus Advocates Respond and Educate (CARE) to Stop Violence at 301-741-3555. Disclosures made to faculty are not confidential and must be reported to the Office of Civil Rights and Sexual Misconduct. For more information visit https://ocrsm.umd.edu/sexual-misconduct/.

Diversity and inclusion

I expect you to treat your classmates with respect, and I expect you to consider that other people may have perspectives and experiences that differ from your own.

The University of Maryland values the diversity of its student body. Along with the University, I am committed to providing a classroom atmosphere that encourages the equitable participation of all students regardless of age, disability, ethnicity, gender, national origin, race, religion, or sexual orientation. Potential devaluation of students in the classroom that can occur by reference to demeaning stereotypes of any group and/or overlooking the contributions of a particular group to the topic under discussion is inappropriate.

Electronic devices in the classroom

I expect that you will pay attention to class when class is in session, and especially when your peers are speaking. To that end, I expect you to manage your electronic devices so that they do not ring in class, and I expect you to use those devices in a way that enhances the class (such as taking notes or looking up related topics during discussion), rather than distracting from it. If you are on your phone and not paying attention to the discussion, you are not participating and will not receive credit for doing so.

Basic Needs Security

If you have difficulty affording groceries or accessing sufficient food to eat every day, or lack a safe and stable place to live and believe this may affect your performance in this course, please visit go.umd.edu/basic-needs for information about resources the campus offers you and let me know if I can help in any way.

Names/Pronouns and Self Identifications

The University of Maryland recognizes the importance of a diverse student body, and we are committed to fostering inclusive and equitable classroom environments. I invite you, if you wish, to tell us how you want to be referred to both in terms of your name and your pronouns (he/him, she/her, they/them, etc.). The pronouns someone indicates are not necessarily indicative of their gender identity. Visit trans.umd.edu to learn more.

Additionally, how you identify in terms of your gender, race, class, sexuality, religion, and dis/ability, among all aspects of your identity, is your choice whether to disclose (e.g., should it come up in classroom conversation about our experiences and perspectives) and should be self-identified, not presumed or imposed. I will do my best to address and refer to all students accordingly, and I ask you to do the same for all of your fellow Terps.

Course schedule

Week	Date	Topic	Due
1	8/27	Course intro	
	8/29	Cybersecurity ecosystem	Discussion 1
2	9/3	Humans of cybersecurity	
	9/5	Other cybersecurity concepts	Discussion 2
3	9/10	Decision theory introduction	
	9/12	Economic theories of cybersecurity	Discussion 3
4	9/17	Rationality and its discontents	
	9/19	Heuristics and biases	Discussion 4
5	9/24	Removable media case study	
	9/26	Bounded rationality	Discussion 5
6	10/1	Signal detection	
	10/3	Review	Discussion 6
7	10/8	**No class**	**Exam 1 (11:59 PM)**
	10/10	Mental models	
8	10/15	Understanding security	
	10/17	Social engineering	Discussion 7
9	10/22	Social engineering and the kill chain	Project topic proposal
	10/24	Behavioral game theory	Discussion 8
10	10/29	Signaling and adversarial thinking	
	10/31	Information search	Discussion 9
11	11/5	Stopping information search	
	11/7	Review	Discussion 10
12	11/12	**No class**	**Exam 2 (11:59 PM)**
	11/14	Interaction design	
13	11/19	Design exercise	Project draft
	11/20	Cognitive engineering	
14	11/26	TBD	Discussion 11
	11/28	**No class – Thanksgiving recess**	
15	12/3	TBD	Discussion 12
	12/5	Wrap-up & case studies	Final project
16	12/17	**Final exam due 12:30PM**	**Final exam (12:30PM)**

All assignments and discussions are due by the beginning of class (3:30 PM) unless otherwise stated.