

University of Texas
McCombs School of Business
MIS 381N (04026) & Law 379M & Eco 395K
Economics of Cybersecurity
Spring Semester 2021

Class Time: M, W 9:30-11:00 am

Classroom: RRH 3.406

Course Webpage: <https://sites.google.com/site/taylorcanann/> & Canvas

Instructor: Taylor "TJ" Canann

Email: taylor.canann@mcombs.utexas.edu

Office: GSB 3.124

Office Hours: By appointment

Course Description and Objectives:

This course examines the Economics of Cybersecurity via the tools found in Game Theory. This course studies economic ideas (the study of scarce resources) to understand the behavioral consequences of policy changes within Cyberspace. We will also analyze policies to determine the extent to which they meet the social goal of efficiency.

This is a graduate level course and will require a great deal of effort on your part. Be sure you are committed to putting in the necessary time to master this material.

Economics of Cybersecurity is a very broad field with many researchers from diverse disciplines. The main topics covered in this course will be:

- Vulnerability Disclosure
- Bug Bounty Systems
- Ransomware
- DDOS Attacks
- Section 230/Net Neutrality
- Cryptocurrencies

At the end of this class you as the student should be able to do the following:

- Understand some of the different models that exist and be able to distinguish between different types of policy solutions.
- Compare policies on the institutions that make them unique and explain the advantages and disadvantages of these institutions.
- Understand basic concepts of information security.
- Demonstrate an understanding of basic economic modeling and economic thought.
- Clearly layout an argument and, using economics, logically defend your argument.
- Read and analyze a journal argument for the way it's written and its structure (intro, findings, etc.).

Required Textbooks:

The Law and Economics of Cybersecurity, Mark F. Grady, and Francesco Parisi.

Cambridge University Press 2011.

ISBN 978-0-521-85527-3

Cyber Security: Economic Strategies and Public Policy Alternatives,

Michael Gallaher, Albert

Link, and Brent Rowe.

Edward Elgar Publishing Limited 2008.

ISBN 978-1-84720-355-7

Other Readings:

Other readings will be made available as the class progresses. Many of the lectures will be based on the extra readings posted on Canvas or the course website.

Beyond this you should maintain a good understanding of cyber issues.

I may deviate from the material in the book if I deem it instructive and I will include complementary material from other sources. Reading the textbook and the handouts are necessary conditions for a successful grade but they are not sufficient. You are responsible for: (1) in-class material (white board), (2) handouts on class website (Canvas/course website), and (3) textbook chapters.

Writing:

Even though the course does not have an explicit writing focus, you are expected to write essays (see course grade section). This course emphasizes CLARITY in both the particular phrasing and the overall organization of your ideas. Correct grammar, punctuation, and word usage are expected. Every graded assignment is an essay, so you must write clearly to earn a good grade. You need to be able to prove that you know the material, which includes clearly expressing your ideas, both grammatically and using appropriate jargon. You may fail the course if you cannot express your ideas properly.

Getting help on your writing: Students are expected to write at a college level. Here are two sources that you can use to improve your writing:

- For help with organization and content, please make an appointment with the **The University Writing Center**. <http://uwc.utexas.edu/>. The center also accommodates walk-in visits at 15 Nicholson Hall to find out about walk-in availability and get on the wait list.
- You can also refer to the **Economists Style Guide**. The free-online version of the guide is temporarily removed. Until it is back, you can buy it from online book retailers. Also see **The Elements of Style**.

Plagiarism will not be tolerated. If I realize you are plagiarizing without referencing your source extensively you will fail the course, though stronger action may be taken. Other penalties may include a complaint to the Office of the Dean of Students. See back of the syllabus for details.

Class announcements and communication:

Announcements concerning syllabus, assignments, lecture, tests, etc. could be made during lectures, via e-mail or posted on the course website. Since announcements may include important information regarding the course, it is highly recommended that you check your e-mail regularly.

Only short answer questions can be addressed by email. I will try to answer emails within 24 hours, EXCEPT over weekends. PLEASE include “[MIS 381N]” or “[Law 379M]” in the subject and include your name in the email. Questions or doubts that require more time should be addressed during office hours.

Grading (Scheme 1):

Homework (1-4)	20%
Speaker Series	5%
Lit Review	25%
Midterm	20%
Final	30%

Grading (Scheme 2):

Data Projects (1-4)	20%
Speaker Series	5%
Lit Review	25%
Data Midterm	20%
Data Final	30%

I must be notified, via email, which grading scheme you have chosen before class on February 3rd.

Grade Disputes:

All assignment, paper, write-up, and exam grade disputes must be submitted within one week after your graded assignment is returned. Only exams typed or written in pen will be considered for re-grading. I will re-grade the entire assignment, which may result in your grade **being lowered**.

Writing for this Course:

You will be asked to submit assignments as **in a group of no larger than four members**, see the below section for more details on groups for this course. You may discuss the questions with other students from other groups in the class, however, you should write and submit your own answers as a group. All essays must be **typed** (single-spaced, 12pt) and submitted at the beginning of the class on the due date. **Late submissions will not be accepted**. Use of **Wikipedia** as a source is forbidden.

Groups:

This course uses a group-centric teaching style. You will be asked to submit assignments as **groups of no more than four people**. You may discuss the assignments with other students from other groups in the class, however, you should write and submit your own assignments **as a group**, i.e. one assignment

should be turned in per group. The only assignment that is not a group assignment is the Speaker Series Write-Up, see below for details.

In order to avoid the problem of boot-strapping your full grade to a group member that fails to do their share of the workload, **there exists a way to “fire” a particular group member.** The group must work as a unit on all assignments that are due up until April 21st. If there is a group member that the remainder of the group would like to “fire”, then the remainder of the group must submit a ½ page write-up on why the specific group member is being “fired” on April 21st. If the “firing” requested is found reasonable, then I will notify the “fired” student that they will be completing the take-home final on their own.

Speaker Series Write-Up:

The Salem Center for Policy will be hosting academic, government, and private sector speakers to discuss policy problems and potential solutions. You are expected to either attend one of the talks, or watch one of the talks when posted online, and write a one-page analysis of the talk. These events can be found here: <https://salemcenter.org/events/>

Homework:

Written homework assignments will be posted on the course website. You are expected to write several essays.

Each homework will consist of three parts:

1. Mathematics: You will be asked to setup and solve basic mathematical models to explain common economic phenomena. (If there are parts of this portion of the assignment that you are unable to type, you must write in pen).
2. Reading: You will be asked to read one to three economic articles from peer-reviewed journals and present a brief write-up about these article(s).
3. Writing: You will be asked to write a short (3-5 page) essay on an extension of a topic discussed in class.

Data Projects:

If you choose Scheme 2, you are expected to analyze data sets and write several essays.

Each project will consist of three parts:

1. Data: You will be asked to setup and solve basic data models to explain common economic phenomena. (If there are parts of this portion of the assignment that you are unable to type, you must write in pen).
2. Reading: You will be asked to read one to three economic articles from peer-reviewed journals and present a brief write-up about these article(s).
3. Writing: You will be asked to write a short (3-5 page) essay on an extension of a topic discussed in class.

Literature Review:

You will need to write an 6-10 (soft cap) page (excluding citations) literature review paper. The first thing you should do is identify an interesting, **specific**, economic question within cybersecurity. A proposed topic for your literature review is due by the beginning of class on February 24th.

Within the literature review, you must use a sufficient amount of papers to argue the current state of the topic. Grading will be based on style and quality of analysis. Your paper grade will be based on content and legibility. The idea and explanation of that idea will account for the majority of the literature review grade.

Exams:

There is one group midterm exam and one comprehensive take-home final exam for the course. Each scheme will have separate exams that will focus on their chosen specialty.

The Math midterm and final will focus on the core mathematical concepts that have been covered in lectures, on the homework assignments, and in the readings.

The Data midterm and final will focus on data analysis, choice of variables, and key economic concepts covered in lecture, on the data projects, and in the readings.

The group midterm will be structured as follows:

- Each group member will receive an exam with three questions, one individual question, one in-class group question, and one take-home group question.
- You will have 55 minutes to work on your exam alone.
- The remaining 35 minutes will be spent working as a group on any of the remaining questions.
- The grade will be broken down as follows: 65% individual question score and 35% the total group score (the cumulative score of all individual questions and the group questions).
- The take-home group question will be assigned the Wednesday (March 3rd) before the exam and will be due the day of the exam.

For the group take-home final, you can use what resources you have, but you may not use classmates outside of your group. You will have one and a half weeks to complete the exam.

Calculators are not allowed on any of the exams, but you may use a slide-rule if you so desire (Nothing on my exams is harder than putting a man on the moon).

The midterm exam will be on March 8th, during class. There is no make-up exam or early exam for the midterm. In the case of a documented medical emergency, your final exam will count for 50% of your overall grade.

The cumulative group take-home final exam is due May 7th by 1 pm (CT) in my office. Since this is a take-home exam, there is no make-up exam.

Lectures:

You should read all the assignments before coming to class. Lectures will focus primarily on clearing up parts of the readings you do not understand. Come prepared to participate.

Extra Credit:

There will be **NO** extra credit of any sort, under any circumstance.

Grading Scale:

%	0-59	60-67	68-69	70-71	72-77	78-79
Grade	F	D	D+	C-	C	C+

%	80-81	82-87	88-89	90-91	92-100
Grade	B-	B	B+	A-	A

Preventing Sexual Harassment:

Title IX of the Education Amendments of 1972 prohibits sex discrimination against any participant in an educational program or activity that receives federal funds. The act is intended to eliminate sex discrimination in education and pertains to admissions, academic and athletic programs, and university-sponsored activities. Title IX also prohibits sexual harassment of students by university employees, other students and visitors to campus. If you encounter sexual harassment or gender-based discrimination, please talk to your professor or contact the Title IX Office at (512) 471-0419, titleix@austin.utexas.edu, or <https://titleix.utexas.edu/>.

Due to SB 212, starting January 1, 2020, all employees of the University of Texas who witness or receive information about sexual harassment, sexual assault, dating violence and stalking that involve a current student or employee must promptly report the incident to the University's Title IX Coordinator or a Deputy Title IX Coordinator. To fully adhere to this law change, all office hours and lectures will be recorded by the instructor.

Free Inquiry Statement:

You are at a University, which is the place for open conversation and the exploration of intellectual ideas and disagreements. The classroom is a forum for critical discussion in the pursuit of truth. Some topics and examples may make you feel uncomfortable. Sometimes you will feel that your beliefs are being challenged or that at odds with other's opinions or even the course assigned materials. That is ok. Acknowledging your emotions is fine, as long you allow your reason and intellect to conduct the intellectual engagement required in our course.

Students have the right to engage in reasoned, polite disagreement with the instructor with no penalty to their grades whatsoever. Everyone has the right to participate in a learning environment that emphasizes mutual respect, tolerance, and free inquiry. Everyone, including those students with opinions in the intellectual minority here on campus, has the right to express his or her philosophical views without fear of bullying or reprisal. The instructor has the right to challenge any beliefs, world-views, ideology, or attitudes held by the students, even world-views that the students hold sacred. Students likewise have this right against the instructor and each other. Only three rules matter in this process: 1) Be polite and respectful, 2) Engage with the ideas, not the person expressing them, and 3) Use sound reasoning and analysis in defending your view.

Tentative Schedule

Date	Topic	Readings	Assignments/Tests
Week 1	Introduction	GP intro, GLR 1	
Week 2	Coop Game Theory	GP 1, GLR 2 GP 2, GLR 3	
Week 3	Non-Coop Game Theory	GP 3, GLR 4 GP 4, GLR 5	Notification of Scheme
Week 4		GP 5, GLR 6 GP 6, GLR 7	HW 1, Project 1
Week 5		GP 7, GLR 12	
Week 6	Vulnerability Disclosure	Readings	Proposal Due
Week 7		Readings	
Week 8		Readings	HW 2, Project 2
Week 9	REVIEW		
Week 10	MIDTERM		
Week 11	MIDTERM POST-MORTEM		
Week 12	SPRING BREAK		
Week 13	SPRING BREAK		
Week 14	Bug Bounty Programs	Readings	
Week 15	DDoS (Booter Services)	Readings	HW 3, Project 3
Week 16		Readings	
Week 17		Readings	
Week 18	Ransomware Attacks	Readings	
Week 19	Section 230/Net Neutrality	Readings	HW 4, Project 4
Week 20	Cryptocurrencies	Readings	Final Draft
Week 21		Readings	Firing Explanation
Week 22			Final Exam Handed Out
Week 23			Speaker Write-Up
Week 24			Final Exam Due By 1pm

GP = Grady and Parisi Text
GLR = Gallaher, Link, and Rowe Text

University/College Mandated Materials

McCombs Classroom Professionalism Policy:

The highest professional standards are expected of all members of the McCombs community. The collective class reputation and the value of the Texas MBA experience hinges on this.

You should treat the Texas MBA classroom as you would a corporate boardroom.

Faculty are expected to be professional and prepared to deliver value for each and every class session. Students are expected to be professional in all respects.

The Texas MBA classroom experience is enhanced when:

- Students arrive on time. On time arrival ensures that classes are able to start and finish at the scheduled time. On time arrival shows respect for both fellow students and faculty and it enhances learning by reducing avoidable distractions.
- Students display their name cards. This permits fellow students and faculty to learn names, enhancing opportunities for community building and evaluation of in-class contributions.
- Students are fully prepared for each class. Much of the learning in the Texas MBA program takes place during classroom discussions. When students are not prepared, they cannot contribute to the overall learning process. This affects not only the individual, but their peers who count on them, as well.
- Students respect the views and opinions of their colleagues. Disagreement and debate are encouraged. Intolerance for the views of others is unacceptable.
- Students do not confuse the classroom for the cafeteria. The classroom (boardroom) is not the place to eat your breakfast tacos, wraps, sweet potato fries, or otherwise set up for a picnic. Please plan accordingly. Recognizing that back-to-back classes sometimes take place over the lunch hour, energy bars and similar snacks are permitted. Please be respectful of your fellow students and faculty in your choices.
- Students minimize unscheduled personal breaks. The learning environment improves when disruptions are limited.
- Students attend the class section to which they are registered. Learning is enhanced when class sizes are optimized. Limits are set to ensure a quality experience. When section hopping takes place some classes become too large and it becomes difficult to contribute. When they are too small, the breadth of experience and opinion suffers.
- Technology is used to enhance the class experience. When students are surfing the web, responding to e-mail, instant messaging each other, and otherwise not

devoting their full attention to the topic at hand they are doing themselves and their peers a major disservice. Those around them face additional distraction. Fellow students cannot benefit from the insights of the students who are not engaged. Faculty office hours are spent going over class material with students who chose not to pay attention, rather than truly adding value by helping students who want a better understanding of the material or want to explore the issues in more depth. Students with real needs may not be able to obtain adequate help if faculty time is spent repeating what was said in class. There are often cases where learning is enhanced by the use of technology in class. Faculty will let you know when it is appropriate.

· Phones and wireless devices are turned off. We've all heard the annoying ringing in the middle of a meeting. Not only is it not professional, it cuts off the flow of discussion when the search for the offender begins. When a true need to communicate with someone outside of class exists (e.g., for some medical need) please inform the professor prior to class.

Remember, you are competing for the best faculty McCombs has to offer. Your professionalism and activity in class contributes to your success in attracting the best faculty to this program.

Diversity and Inclusion:

It is my intent that students from all diverse backgrounds and perspectives be well served by this course, that students' learning needs be addressed and that the diversity that students bring to this class can be comfortably expressed and be viewed as a resource, strength and benefit to all students. Please come to me at any time with any concerns.

Academic Dishonesty:

I have no tolerance for acts of academic dishonesty. Such acts damage the reputation of the school and the degree and demean the honest efforts of the majority of students. The minimum penalty for an act of academic dishonesty will be a zero for that assignment or exam.

The responsibilities for both students and faculty with regard to the Honor System are described on the final pages of this syllabus. As the instructor for this course, I agree to observe all the faculty responsibilities described therein. As a Texas MBA student, you agree to observe all of the student responsibilities of the Honor Code. If the application of the Honor System to this class and its assignments is unclear in any way, it is your responsibility to ask me for clarification.

Students with Disabilities:

Upon request, the University of Texas at Austin provides appropriate academic accommodations for qualified students with disabilities. Services for Students with

Disabilities (SSD) is housed in the Office of the Dean of Students, located on the fourth floor of the Student Services Building. Information on how to register, downloadable forms, including guidelines for documentation, accommodation request letters, and releases of information are available at <https://diversity.utexas.edu/disability/about/>. Please do not hesitate to contact SSD at (512) 471-6259, Videophone: (512) 410-6644 or via e-mail (ssd@austin.utexas.edu) if you have any questions.

Honor Code Purpose:

Academic honor, trust and integrity are fundamental to The University of Texas at Austin McCombs School of Business community. They contribute directly to the quality of your education and reach far beyond the campus to your overall standing within the business community. The University of Texas at Austin McCombs School of Business Honor System promotes academic honor, trust and integrity throughout the Graduate School of Business. The Honor System relies upon The University of Texas Student Standards of Conduct (Chapter 11 of the Institutional Rules on Student Service and Activities) for enforcement, but promotes ideals that are higher than merely enforceable standards. Every student is responsible for understanding and abiding by the provisions of the Honor System and the University of Texas Student Standards of Conduct. The University expects all students to obey the law, show respect for other members of the university community, perform contractual obligations, maintain absolute integrity and the highest standard of individual honor in scholastic work, and observe the highest standards of conduct. Ignorance of the Honor System or The University of Texas Student Standards of Conduct is not an acceptable excuse for violations under any circumstances.

The effectiveness of the Honor System results solely from the wholehearted and uncompromising support of each member of the McCombs School of Business community. Each member must abide by the Honor System and must be intolerant of any violations. The system is only as effective as you make it.

Faculty Involvement in the Honor System

The University of Texas at Austin McCombs School of Business Faculty's commitment to the Honor System is critical to its success. It is imperative that faculty make their expectations clear to all students. They must also respond to accusations of cheating or other misconduct by students in a timely, discrete and fair manner. We urge faculty members to promote awareness of the importance of integrity through in-class discussions and assignments throughout the semester.

Expectations Under the Honor System

Standards

If a student is uncertain about the standards of conduct in a particular setting, he or she should ask the relevant faculty member for clarification to ensure his or her conduct falls within the expected scope of honor, trust and integrity as promoted by

the Honor System. This applies to all tests, papers and group and individual work. Questions about appropriate behavior during the job search should be addressed to a professional member of the Career Management Office. Below are some of the specific examples of violations of the Honor System.

Lying

Lying is any deliberate attempt to deceive another by stating an untruth, or by any direct form of communication to include the telling of a partial truth. Lying includes the use or omission of any information with the intent to deceive or mislead.

Examples of lying include, but are not limited to, providing a false excuse for why a test was missed or presenting false information to a recruiter.

Stealing

Stealing is wrongfully taking, obtaining, withholding, defacing or destroying any person's money, personal property, article or service, under any circumstances. Examples of stealing include, but are not limited to, removing course material from the library or hiding it from others, removing material from another person's mail folder, securing for one's self unattended items such as calculators, books, book bags or other personal property. Another form of stealing is the duplication of copyrighted material beyond the reasonable bounds of "fair use." Defacing (e.g., "marking up" or highlighting) library books is also

considered stealing, because, through a willful act, the value of another's property is decreased. (See the appendix for a detailed explanation of "fair use.")

Cheating

Cheating is wrongfully and unfairly acting out of self-interest for personal gain by seeking or accepting an unauthorized advantage over one's peers. Examples include, but are not limited to, obtaining questions or answers to tests or quizzes, and getting assistance on case write-ups or other projects beyond what is authorized by the assigning instructor. It is also cheating to accept the benefit(s) of another person's theft(s) even if not actively sought. For instance, if one continues to be attentive to an overhead conversation about a test or case write-up even if initial exposure to such information was accidental and beyond the control of the student in question, one is also cheating. If a student overhears a conversation or any information that any faculty member might reasonably wish to withhold from the student, the student should inform the faculty member(s) of the information and circumstance under which it was overheard.

Actions Required for Responding to Suspected and Known Violations

As stated, everyone must abide by the Honor System and be intolerant of violations. If you suspect a violation has occurred, you should first speak to the suspected violator in an attempt to determine if an infraction has taken place. If, after doing so, you still believe that a violation has occurred, you must tell the suspected

violation that he or she must report himself or herself to the course professor or Associate Dean of the McCombs School of Business. If the individual fails to report himself or herself within 48 hours, it then becomes your obligation to report the infraction to the course professor or the Associate Dean of the McCombs School of Business. Remember that although you are not required by regulation to take any action, our Honor System is only as effective as you make it. If you remain silent when you suspect or know of a violation, you are approving of such dishonorable conduct as the community standard. You are thereby precipitating a repetition of such violations.

The Honor Pledge

The University of Texas at Austin McCombs School of Business requires each enrolled student to adopt the Honor System. The Honor Pledge best describes the conduct promoted by the Honor System. It is as follows:

"I affirm that I belong to the honorable community of The University of Texas at Austin Graduate School of Business. I will not lie, cheat or steal, nor will I tolerate those who do."

"I pledge my full support to the Honor System. I agree to be bound at all times by the Honor System and understand that any violation may result in my dismissal from the McCombs School of Business."