Conflict in Cyberspace
(PPPE / PSCI 6302)

Instructor: Anton Sobolev

Fall '25

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Office Hours: TU 3:00pm-5:00pm
Office: GR 2.238

Web: TBD
Class Hours: TU 4:00pm-6:45pm | TR 7:00pm - 9:45pm
Class Room: AD 3.216 | GR 3.606

Course Description

Cyberspace is not an isolated concept. It expands beyond the conventional notions of networks. Indeed, despite its technical specificities, cyberspace is a domain of human interactions. While many security issues organizations and individuals face are highly technical, their underlying causes and systematic effects are inherently behavioral. Therefore, it makes little sense to approach cybersecurity from a narrow, purely technical perspective. Yet many courses focus on 'the mechanics' of cybersecurity at the expense of behavioral and political aspects. In contrast, this class considers cyberspace as a synergistic entity. First, it examines conflicts and violence in the pre-digital age. Next, it discusses the origins, organization, and evolution of cyberspace. Finally, it explores how cyberspace reshapes conventional conflicts and produces new ones.

Learning Objectives

There are three learning objectives for this course:

- Gain a foundational understanding of what cyberspace is and how it functions. Cyberspace operates on multiple dimensions. Knowing its underlying fundamentals is crucial to understand how states, non-state, and individual actors use digital technologies to their benefit.
- Learn to analyze the complexities and challenges of cyberspace with a combination of behavioral and technical perspectives. Appraising multiple aspects in an ensemble helps a professional gain essential insights and develop brand-new solutions for cybersecurity problems.
- Learn multiple languages of cybersecurity. Technical, policy, and scholarly communities use different frameworks and methods when discussing cyberspace. The absence of a "common language" disconnects these communities from each other and hinders productive cooperation. As a result, both the public and private sectors exhibit high demand for specialists who can speak multiple cyber "languages."

These learning objectives will be assessed through class discussion, individual work, and presentations.

Course Modality and Expectations

Instructional Mode

The class will meet at our scheduled time. Students who test positive for COVID-19 or who are required to isolate or quarantine will be able to participate in the class remotely

Office Hours

Office hours are held in person or via MS Teams. Students use anton-sobolev.youcanbook.me to book their slot. Students need to book a slot at least 24 hours in advance. If you want to attend via MS Teams please write MSTEAMS after your name in the scheduling form.

Updates

Keep checking the class website regularly. Please bear in mind that this is a new course, so I reserve the right to make mid-course corrections. I also welcome feedback.

Prerequisites

In addition to a confident level of computer and Internet literacy, certain minimum technical requirements must be met to enable a successful learning experience. Please review the important technical requirements on the Getting Started with eLearning webpage.

Course Requirements

You are expected to attend every class and to be prepared to discuss all the assigned reading. If you find you cannot attend, please notify your instructor in advance.

Course Access and Materials

This course can be accessed using your UT Dallas NetID account on the eLearning website.

Due to the dynamic nature of our subject matter, no single book exists that meets all course requirements. Readings for each class are listed in the course schedule. All required readings are available via the class website or UTD library.

Recommended Readings

- Van Puyvelde, Damien & Aaron Brantly (2019). *Cybersecurity: Politics, Governance, and Conflict in Cyberspace*. John Wiley & Sons.
- Cornish, Paul (2021). *The Oxford Handbook of Cyber Security*. Oxford University Press.
- DiMaggio, Jon (2022). *The Art of Cyberwarfare: An Investigator's Guide to Espionage, Ransomware, and Organized Cybercrime*. No Starch Press.
- Bueno de Mesquita, Bruce & Anthony Fowler (2021). *Thinking Clearly with Data: A Guide to Quantitative Reasoning and Analysis*. Princeton University Press.
- Kahneman, Daniel (2011). *Thinking, Fast and Slow*. Macmillan Press.

Course Assignments and Evaluation

Your grade has several components such as attendance, participation, two problem sets, one individual presentation, and a report. The breakdown of each component of your overall grade is as follows:

Component	%
Participation	10
Attendance	10
In-Class Quizzes (11)	44
Home Assignments in R (13)	42
Midterm Exam	15
Final Exam	20
Total	141

Participation (10)

You are expected to contribute regularly to class discussions, drawing from the assigned readings and integrating lessons from earlier meetings.
Active participation demonstrates preparation, critical thinking, and engagement with course material.

Attendance (10)

Attendance is mandatory. Students are expected to be present at each class session.
Consistent attendance is essential to keep up with discussions, in-class activities, and collaborative learning.

In-Class Quizzes (11) (44)

Closed-book quizzes will be administered at the beginning of almost every class. They are designed to ensure students arrive prepared to engage with readings and team activities. Each quiz consists of multiple-choice questions, is time-limited, and must be completed individually in one sitting. Quizzes cannot be paused, retaken, or discussed with others.

Home Assignments (13) (15)

There will be 13 mandatory assignments completed in R. Late submissions will not be accepted without prior permission. Students may discuss the problems together, but each must independently produce and submit solutions.

Midterm Exam (15)

The midterm is a closed-book, individual written exam designed to test students' understanding of key concepts from the first half of the course. It will consist of a combination of short-answer and essay-style questions, requiring synthesis, critical thinking, and application of theories learned in readings and lectures.
The midterm will be conducted during class time and must be completed within the allotted time frame.

Final Exam (20)

The final is a comprehensive, closed-book written exam covering the entire course.
It will test students' ability to integrate theories, concepts, and case studies discussed throughout the semester.
The exam will include essay questions that require deep analysis and application of course content to new scenarios.
Students must complete the final exam individually within the scheduled class period.
Proper preparation, including regular engagement with readings and active participation in class, will be essential for success.

Grading Scale

Grade	Score	Grade	Score
A	> 110	C	68–74
A–	103–109	C–	61–67
B+	96–102	D+	54–60
B	89–95	D	47–53
B–	82–88	D–	40–46
C+	75–81	F	<40

A Note on Academic Integrity

Please visit the university's Community Standards and Conduct website on using sources and revisit the university's Academic Integrity Policy. The University takes plagiarism infractions seriously, and penalties for students caught plagiarizing include suspension, lowered or failing grades, and possible expulsion. In general, if you have any questions, please feel free to ask your instructor.

Diversity and Inclusion

This course should serve the needs of students from all backgrounds and perspectives. Students with disabilities enrolled in this course who may need disability-related classroom accommodations are encouraged to make an appointment to see the instructor before the end of the second week of the quarter. All conversations will remain confidential. Please also arrange to have the required documentation sent to `anton.sobolev@utdallas.edu` for any accommodations at your earliest convenience.

Technology in the Classroom

No smart phones may be used in class. Class discussions may not be recorded.

You will frequently make use of computers in this course during lecture periods and discussion sections. Please be respectful to your instructor and your peers by using your computers only for class-related purposes. Please put your phone away before class starts and don't bring it out.

Development of this Course

Learning should not happen in a vacuum. To help ensure the best chance for success for the students of this course, this course draws on the format, syllabus, and materials from similar successful courses at peer institutions.

Academic Calendar

Week 01, 08/25 - 08/29: Introduction and Logistics

Week 02, 09/01 - 09/05: Strategic Behavior with Game Theory

In-Class Quiz 01
- Chwe, Michael. *Rational Ritual: Culture, Coordination, and Common Knowledge* (2003), Ch. 1
- Calıskan, E. M. (2025). "Cyber Conflict Game Theory: Strategic Analysis of Global Cyber Crises in the 2000s." *Security and Defence Quarterly*.

Assignment due 01: Introduction to R

Week 03, 09/08 - 09/12: Statistical Analysis of Strategic Behavior – 1

In-Class Quiz 02
- *Naked Statistics*, Ch. 2
- Dixit & Nalebuff, *The Art of Strategy*, Ch. 4 & 9
- King et al., *The Science in Social Science*, Ch. 1

Assignment due 02: Data Visualization with ggplot2: Attempt #1

Week 04, 09/15 - 09/19: Statistical Analysis of Strategic Behavior – 2

In-Class Quiz 03
- Bueno de Mesquita & Fowler, Ch. 1, *Thinking Clearly in a Data-Driven Age*
- Yang, Y., Grandel, S., Balasubramanian, D., Huang, Y., & Leach, K. (2025). "A Human Study of Cognitive Biases in Web Application Security." *Proceedings of HotSoS '25*. ACM

Assignment due 03: Statistics in R

Week 05, 09/22 - 09/26: Computational Analysis of Strategic Behavior

In-Class Quiz 04
- Stephens-Davidowitz, S. *Everybody Lies* (2018), Ch. 3 "Data Reimagined"
- Crouser, R. J., Fukuda, E., & Sridhar, S. (2017). "Retrospective on a Decade of Research in Visualization for Cybersecurity." *IEEE HST*.

Assignment due 04: Data Visualization with ggplot2: Attempt #2

Week 06, 09/29 - 10/03: Counterfactual Analysis of Strategic Behavior

In-Class Quiz 05
- Pearl, J., & Mackenzie, D. *The Book of Why* (2018), Ch. 1 "Mind over Data" & Ch. 10 "Big Data, AI, and the Big Questions"
- Rawal, A., et al. (2025). "Causality for trustworthy artificial intelligence: status, challenges and perspectives." *ACM Computing Surveys*, 57(6): 1–30

Assignment due 05: Probability Puzzles

Week 07, 10/06 - 10/10: Understanding Conflict. Midterm Preview

In-Class Quiz 06
- Olson, M. (2000). *The Logic of Power*

- Hodgson, Q. E. (2024). "Cyber coercion as a tool of statecraft: how often, how effective?" *Research Handbook on Cyberwarfare*, pp. 247–260

Assignment due 06: Communicating Data Insights

Week 08, 10/13 - 10/17: Midterm Exam (in-class)

No readings.

Week 09, 10/20 - 10/24: Brief History of Communications / What is Cyberspace / Technology Steps In

In-Class Quiz 07

- *Early History of Cyberspace*, Ch. 2
- Carr, M. (2021). *A Political History of Cyberspace*
- Shi, X. (2025). "The Historical Development and Applications Analysis of Wireless Communication Technology." *Theoretical and Natural Science*, 80, 58–63.

Assignment due 07: Understanding GDPR

Week 10, 10/27 - 10/31: How Cyberspace Transforms Conflicts

In-Class Quiz 08
Weidmann, N. B. (2015). "Communication Technology and Conflict."

Trujillo, G. (2024). *Cyberspace, Cyber Sovereignty, and Cyber Conflict: The Digital Wild West*. Diss., JHU, Ch. 2

Assignment due 08: Science of Strategic Decisions

Week 11, 11/03 - 11/07: Cyberspace & Military Operations

In-Class Quiz 09
- Kostyuk, N., & Gartzke, E. (2023). "Fighting in Cyberspace: Internet Access and the Substitutability of Cyber and Military Operations." *Journal of Conflict Resolution*, 68(1), 80–107
- Katagiri, N. (2024). "Artificial Intelligence and Cross-Domain Warfare: Balance of Power and Unintended Escalation." *Global Society*, 38(1), 34–48

Assignment due 09: Inference for Categorical Data

Week 12, 11/10 - 11/14: Domestic Conflicts

In-Class Quiz 10
- Rydzak, J. (2021). "Internet Shutdowns and Collective Action."
- Maina, T. M. (2025). "Artificial Intelligence in Digital Activism: Catalysing Kenya's Protest to the Finance Bill 2024." *IJSRMS*, 11(1)
- Enikolopov, R., et al. (2018). "Political Effects of Social Media." - Frantz, E. (2020). "Digital Repression in Autocracies."

Assignment due 10: Data Privacy

Week 13, 11/17 - 11/21: Cyberspace & New Types of Conflict

In-Class Quiz 11

Roberts, M. E. (2018). Ch. 2.2 "Friction and Flooding."

Vićić, J., & Gartzke, E. (2024). "Cyber-enabled influence operations as a 'center of gravity' in cyberconflict: The example of Russian foreign interference in the 2016 US federal election." *Journal of Peace Research*, 61(1), 10–27

Assignment due 11: Analyzing Social Media Data in R

Week 14, 11/24 - 11/28: No Class — Fall Break / Thanksgiving

No readings.

Week 15, 12/01 - 12/05: Final Exam

Assignment due 12: AI Agents

No readings.

Week 16, 12/08 - 12/12: Review of Final Exam / Conclusions: What will cyberconflict look like tomorrow?

Assignment due 13: Understanding the EU AI Act

No readings.

Classroom Safety and COVID-19

To help preserve the University's in-person learning environment, UT Dallas recommends the following:

Adhere to the University's CDC Updated Guidelines issued on July 30, 2021. All Comets are strongly encouraged to wear face coverings indoors regardless of vaccination status. Please note this represents a change in the campus guidance issued on May 20, 2021.

Accommodations for Students Who Must Isolate or Quarantine Due to COVID-19

Students who test positive for COVID-19 or who are required to isolate or quarantine will be able to participate in the class remotely. Records of the seminar meetings will be available for those students during the period the students must isolate or quarantine. Students should not attend class in person until cleared by campus tracers. Visit Comets United webpage to obtain the latest information on the University's guidance and resources for campus health and safety.

Communication

This course utilizes online tools for interaction and communication. Some external communication tools such as regular email and a web conferencing tool may also be used during the semester. For more details, please visit the Student eLearning Tutorials webpage for video demonstrations on eLearning tools.

Student emails and discussion board messages will be answered within 3 working days under normal circumstances.

Distance Learning Student Resources

Online students have access to resources including the McDermott Library, Academic Advising, The Office of Student AccessAbility, and many others. Please see the eLearning Current Students webpage for more information.

Server Unavailability or Other Technical Difficulties

The University is committed to providing a reliable learning management system to all users. However, in the event of any unexpected server outage or any unusual technical difficulty which prevents students from completing a time sensitive assessment activity, the instructor will provide an appropriate accommodation based on the situation. Students should immediately report any problems to the instructor and also contact the online eLearning Help Desk. The instructor and the eLearning Help Desk will work with the student to resolve any issues at the earliest possible time.

Class Materials

The Instructor may provide class materials that will be made available to all students registered for this class as they are intended to supplement the classroom experience. These materials may be downloaded during the course, however, these materials are for registered students' use only. Classroom materials may not be reproduced or shared with those not in class, or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Classroom Conduct Requirements Related to Public Health Measures

UT Dallas will follow the public health and safety guidelines put forth by the Centers for Disease Control and Prevention (CDC), the Texas Department of State Health Services (DSHS), and local public health agencies that are in effect at that time during the Fall 2021 semester to the extent allowed by state governance. Texas Governor Greg Abbott's Executive Order GA-38 prohibits us from mandating vaccines and face coverings for UT Dallas employees, students, and members of the public on campus. However, we strongly encourage all Comets to get vaccinated and wear face coverings as recommended by the CDC. Check the Comets United: Latest Updates webpage for the latest guidance on the University's public health measures. Comets are expected to carry out Student Safety protocols in adherence to the Comet Commitment. Unvaccinated Comets will be expected to complete the Required Daily Health Screening. Those students who do not comply will be referred to the Office of Community Standards and Conduct for disciplinary action under the Student Code of Conduct – UTSP5003.

Class Participation

Regular class participation is expected. Students who fail to participate in class regularly are inviting scholastic difficulty. A portion of the grade for this course is directly tied to your participation in this class. It also includes engaging in group or other activities during class that solicit your feedback on homework assignments, readings, or materials covered in the lectures (and/or labs).

Class participation is documented by faculty. Successful participation is defined as consistently adhering to University requirements, as presented in this syllabus. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Class Recordings

Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. Unless the Office of Student AccessAbility has approved the student to record the instruction, students are expressly prohibited from recording any part of this course. Recordings may not be published, reproduced, or shared with those not in the class, or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

The instructor may record meetings of this course. These recordings will be made available to all students registered for this class if the intent is to supplement the classroom experience. If the instructor or a UTD school/department/office plans any other uses for the recordings, consent of the students identifiable in the recordings is required prior to such use unless an exception is allowed by law.

Comet Creed

This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same: *"As a Comet, I pledge honesty, integrity, and service in all that I do."*

Academic Support Resources

The information contained in the following link lists the University's academic support resources for all students. Please go to Academic Support Resources webpage for these policies.

UT Dallas Syllabus Policies and Procedures The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus. Please review the catalog sections regarding the credit/no credit or pass/fail grading option and withdrawal from class.

Please go to UT Dallas Syllabus Policies webpage for these policies.

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.