MSDS 485 - Data Governance, Ethics, and Law Sample Syllabus for Spring 2024

Instructor and TA Contact Information/Photos/Bios Go Here

Course Description

This course covers the ethical, legal and data governance implications of information technologies. The course begins with ethical concerns, especially those of artificial intelligence and other emerging technologies, followed by an overview of international data privacy, intellectual property, and security regulations, including those affecting specific industries. The course introduces data management, including data quality and integrity, the data lifecycle, encryption, blockchain, and cybersecurity. Students learn how to evaluate and plan an organization's data governance policies and roles. Prerequisites: None.

Course Objectives

By the end of this course, you will be able to:
- Explore the ethical challenges of data use management, especially in relation to AI, generative AI, cybersecurity, privacy, and national and global legislation.
- Demonstrate mastery of data management concepts related to data quality, integrity, usability, consistency, availability, and security.
- Assess and propose mitigation strategies related to cybersecurity and network security risks.
- Describe the useful applications of encryption and blockchain technology.
- Contrast US, EU and global privacy and cybersecurity policies and legislation. .
- Build a data governance framework exhibiting the best practices of data management principles.

Prerequisites

None.

Diversity Statement

As educators and learners, we must share a commitment to diversity and equity, removing barriers to education so that everyone may participate fully in the community. In this course, we respect and embrace the unique experiences that brought each person here, including backgrounds, identities, learning styles, ways of expression, and academic interests. The broad spectrum of perspectives represented by our students enrich everyone's experiences, and we strive to meet each perspective with openness and respect.

Required Readings and Resources

Course Reserves

Some readings will be available through the Course Reserves in the course navigation menu. For assistance with Course Reserves, e-mail e-reserve@northwestern.edu. To ask a librarian for assistance, visit Northwestern's [Ask A Librarian](#) page.

Optional Readings and Resources

Clearly labeled optional readings and resources may be provided throughout the course.

Additional Resources for Learning Chicago Style

- *The Chicago Manual of Style*, 17th ed. 2017. Chicago, IL: University of Chicago Press, 2017. The entire *The Chicago Manual of Style* text is available through the at the Northwestern library (student will be asked to sign in). Chapter 2 and Chapter 15 are the most important chapters, with Chapter 15 pertaining to the Author-Date Reference system used in Data Science.
    - Chapter 2: Manuscript Preparation, Manuscript Editing, and Proofreading
    - Chapter 15: Author-Date References
- Purdue University OWL: *The Chicago Manual of Style*, 17th ed. The Purdue OWL resources provide summarized and easily accessible pages covering the main topics students need for formatting, citing, and referencing in *CMOS* 17 style. (Use site with caution; the site defaults to Notes-Bibliography rather than Author-Date Reference.)
    - A PDF of a sample paper using the Author-Date reference list format is available to download from the Purdue OWL site: *CMOS* Author Date Sample Paper
- Google docs: you can automatically format your citations by following these steps:
    - Open a document
    - Click Tools > Citations
    - Select a formatting style Chicago Author-Date (17th ed.)

Assignment Overview and Grading Breakdown

Grading will be completed by, if not before, the following Sunday evening after they have been submitted.

The student's final grade will be based on discussion posts and participation, case study reviews, and group assignments including a final group project. Students will be graded on rubrics, which can be found attached to each assignment.

Your final grade will be determined as follows:

Discussion Participation Weekly class participation includes posting to discussion forums. You will be expected to provide quality insights in class discussion forums in a timely fashion. The discussion boards are graded on a 10-point scale and weighted to be 20% of the final grade.	100 pts 20%
Group Assignments Students will have four group assignments to complete along with preparation for the final project/presentation. The assignments are graded on a 100-point scale and weighted to be 40% of the final grade. In addition to joining a group (worth 5 points), groups will submit the following assignments. • Ethics in Organizations (week 3) • Digital Trust Assessment (week 5) • Global Data Breach (week 8)	200 pts 40%
Individual assignments – Case Study Alongside your required readings and media, each module includes a handful of case studies relevant to the week's topic. Your instructor may require you to review one or more of these case studies as part of your preparation for the week and may discuss them in the sync session. As with all course materials, you may refer to the posted case studies in your discussion posts. You will choose from these case studies for three individual submissions: Two case studies due week 4 (40 pts) Two case studies due week 7 (40 pts) One case study due week 9 (20 pts)	100 pts 20%
Final Data Governance Semester Project The final group project/presentation will be a recorded presentation. The final roadmap project is graded on a 100-point scale and weighted to be 20% of the final grade.	100 pts 20%
TOTAL	500 pts 100%

Grading Scale

Grade	Percentage	Total Points (out of 500)
A	93%–100%	465 – 500 points
A-	90%–92%	450 – 464 points
B+	87%–89%	435 – 449 points
B	83%–86%	415 – 434 points
B-	80%–82%	400 – 414 points
C+	77%–79%	385 – 399 points
C	73%–76%	365 – 384 points
C-	70%–72%	350 – 364 points
F	0%–69%	0 – 349 points

The School of Professional Studies does not award D grades in graduate coursework.

Late Work Policy

Late work will be accepted only in the case of a student emergency, or in the event of an instructor-approved absence. Contact your instructor as soon as possible.

Online Communication and Interaction Expectations

Discussion Forums

The purpose of the discussion boards is to allow students to freely exchange ideas. It is imperative to remain respectful of all viewpoints and positions and, when necessary, agree to respectfully disagree. While active and frequent participation is encouraged, cluttering a discussion board with inappropriate, irrelevant, or insignificant material will not earn additional points and may result in receiving less than full credit. Frequency matters, but contributing content that adds value is paramount. Please remember to cite all sources when referencing anything that is not your own idea or creation to avoid plagiarism. Although we will use Chicago style (*CMOS* 17) for written work in this course, you are not required to use any particular style when citing or referencing in your discussion posts.

The quality of your posts and how others view and respond to them are most valued. A single statement amounting to "I agree" or "I do not agree" is not counted as a post. Explain, clarify, politely ask for details, provide details, persuade, and enrich communications for a great

discussion experience. Post your first post responding to one of the discussion prompts by Friday. Respond to at least two fellow classmates' posts by the end of the week.

Online Communication Etiquette

Beyond interacting with your instructor and peers in discussions, you will be expected to communicate by Canvas message, email, and sync session. Your instructor may also make themselves available by phone or text. In all contexts, keep your communication professional and respect the instructor's posted availability. To learn more about professional communication, please review the Communicating Effectively with Faculty guide.

Just as you expect a response when you send a message to your instructor, please respond promptly when your instructor contacts you. Your instructor will expect a response within two business days. This will require that you log into the course site regularly and set up your notifications to inform you when the instructor posts an announcement, provides feedback on work or sends you a Canvas message. For guidance on setting your notifications, please review How do I set my Canvas notification settings as a student? It is also recommended that you check your u.northwestern e-mail account regularly ,or forward your u.northwestern e-mail to an account you check frequently.

Participation and Attendance

This course is "asynchronous." Although sync sessions take place at a designated time, you may choose whether to attend live or to watch the recordings. Valuable information is conveyed in sync sessions, and although you will not be graded on attendance at them, you could miss important information if you don't at least view the recordings. In addition, all course goals, session learning objectives, and assessments are supported through classroom elements that can be accessed at any time.

Important information is also conveyed in Canvas announcements. Announcements are also emailed out to your Northwestern mail.

Faculty Observer

Please note that this course may have a faculty observer for this term. The observer is present in the Canvas site and some Zoom sessions exclusively for training purposes. They will not be responsible for, or engage in, any in-class interactions, student assessment or grading, or any other aspect of course delivery. If you have questions or concerns about the faculty observer, please contact your instructor.

Student Support Services

AccessibleNU

This course is designed to be welcoming to, accessible to, and usable by everyone, including students who are English-language learners, have a variety of learning styles, have disabilities, or are new to online learning. Be sure to let me know immediately if you encounter a required element or resource in the course that is not accessible to you. Also, let me know of changes I can make to the course so that it is more welcoming to, accessible to, or usable by students who take this course in the future.

Northwestern University and AccessibleNU are committed to providing a supportive and challenging environment for all undergraduate, graduate, professional school, and professional studies students with disabilities who attend the University. Additionally, the University and AccessibleNU work to provide students with disabilities and other conditions requiring accommodation a learning and community environment that affords them full participation, equal access, and reasonable accommodation. The majority of accommodations, services, and auxiliary aids provided to eligible students are coordinated by AccessibleNU, which is part of the Dean of Students Office.

SPS Student Services

The Student Services advising team assists students in a variety of matters during their time at SPS. Each program has an assigned adviser to help students with academic planning (course selection, degree planning, adding/dropping courses), policies, and administrative procedures, and to serve as a guide to resources at SPS and the greater Northwestern community. Student advisers use both proactive advising to keep students on track and intrusive advising to help resolve issues or concerns.

Student advisers can serve as a resource in student issues including, but not limited to, providing guidance to a student in danger of failing class or who may be looking to drop a class, making contact with a student who is not responsive to messages from faculty, and assisting a student experiencing family or medical issues that are impacting their academics. The advising team can be reached at spsacademicadvising@northwestern.edu, and more information on the academic advisers and available student services can be found on the SPS Student Services page.

Academic Support Services

Northwestern University Library

As one of the leading private research libraries in the United States, Northwestern University Library serves the educational and information needs of its students and faculty as well as scholars around the world. Visit the Library About page for more information or contact Distance Learning Librarian Tracy Coyne at 312-503-6617 or tracy-coyne@northwestern.edu.

Program-Specific Library Guides

- Data Management
- Data Science

Additional Library Resources

- Connectivity: Campus Wireless and Off-Campus Access to Electronic Resources
- Getting Available Items: Delivery to Long-Distance Patrons
- Quick Access to Major Newspapers
- Reserve a Library Study Room
- Resources for Data Analysis
- Schaffner Library Top Resources
- Sign up for an in-person or online Research Consultation Appointment
- Social Science Data Resources

The Writing Place

The Writing Place is Northwestern's center for peer writing consultations. Consultations are free and available to anyone in the Northwestern community: undergraduates, graduate students, faculty, or staff. To book an appointment, go to The Writing Place website.

The Math Place

The Math Place is a free tutorial service provided to students currently enrolled in Northwestern University's School of Professional Studies courses or in other Northwestern University courses. Students of all levels can benefit from the individual tutoring provided from this service, whether they are taking undergraduate or graduate-level courses. To book an appointment, go to The Math Place website.

SPS Learning Studios

Learning studios are available to students who would like additional support in commonly used tools and topics, including statistics, Excel, and coding in R. An instructor is available to answer your questions as you work through self-paced content and exercises. Students can self-enroll for free by visiting the SPS Academic Services page.

Read&Write Gold

Read&Write Gold is an optional text reading and writing program with numerous beneficial features. Originally developed to assist users with print disabilities, such as visual impairments, dyslexia, ADHD, etc., this program provides a wide array of tools to assist with reading, writing, and notetaking. One of the most useful tools is the text-to-speech function, which students may use to convert digital text into an audio format.

Read&Write Gold is available for free to all Northwestern students, faculty, and staff. Visit the Northwestern IT site on Read&Write Gold for more information about the software, as well as instructions on how to download it.

Academic Integrity at Northwestern

Students are required to comply with University academic integrity regulations. If you are in doubt about what constitutes academic dishonesty, speak with your instructor or graduate coordinator before the assignment is due and/or examine the University website. Academic dishonesty includes, but is not limited to, cheating on an exam, obtaining an unfair advantage, and plagiarism (e.g., using material from readings without citing or copying another student's paper). Failure to maintain academic integrity will result in a grade sanction, possibly as severe as failing and being required to retake the course, and could lead to a suspension or expulsion from the program. Further penalties may apply. For more information, visit The Office of the Provost's Academic Integrity page.

Some assignments in SPS courses may be required to be submitted through Turnitin, a plagiarism detection and education tool. You can find an explanation of the tool at this link: Turnitin Help: https://help.turnitin.com/feedback-studio/canvas/canvas-home.htm

You may also enjoy this video from Snoop Dogg that he created for a professor friend. Snoop Dogg says read the syllabus!: Video link: https://www.youtube.com/watch?v=aOIvB2YtAhY

Course Technology

This course will involve a number of different types of interactions. These interactions will take place primarily through the Canvas system. Please take the time to navigate through the course and become familiar with the course syllabus, structure, and content and review the list of resources below.

Systems Requirements for Distance Learning

Students and faculty enrolled in SPS online classes should have access to a computer with the [Minimum System Requirements, which can be found at SPS Support site: https://sps.northwestern.edu/download/downloads_files.php](https://sps.northwestern.edu/download/downloads_files.php)

Canvas

The [Canvas Student Center](#) includes information on communicating in Canvas, navigating a Canvas course, grades, additional help, and more. The [Canvas at Northwestern](#) website provides information of getting to know Canvas at Northwestern and getting Canvas support. The [Canvas Student Guide](#) provides tutorials on all the features of Canvas. For additional Canvas help and support, you can always click the Help icon in the lower-left corner to begin a live chat with Canvas support or contact the Canvas Support Hotline.

The [Canvas Accessibility Statement](#) and [Canvas Privacy Policy](#) are also available.

Zoom

We will use Zoom for optional synchronous meetings. The [Zoom support page](#) provides additional guidance for using Zoom, and the [Zoom for Students in Canvas](#) page has guidance specifically for students.

The [Zoom Privacy Policy](#) and the [Accessibility Features on Zoom](#) are also available.

Please note that any scheduled synchronous meetings are optional. While your attendance is highly encouraged, it is not required and you will not be graded on your attendance or participation. These synchronous sessions will be recorded, so you will be able to review the session afterward.

Panopto

Videos in this course may be hosted in Panopto. If you have not used Panopto in the past, you may be prompted to log in to Panopto for the first time and authorize Panopto to access your Canvas account. You can learn more about using Panopto and login to Panopto directly by

visiting the Panopto guide on the [Northwestern IT Resource Hub](#). Depending on the assignment requirements of this course, you may be asked to create videos using Panopto in addition to viewing content that your instructor has provided through Panopto.

The [Panopto Privacy Policy](#) and the [Accessibility Features on Panopto](#) are also available.

Required Technical Skills

Students in an online program should be able to do the following:
- Communicate via email and Canvas discussion forums.
- Use web browsers and navigate the World Wide Web.
- Use the learning management system Canvas.
- Use integrated Canvas tools (e.g., Zoom, Panopto, Course Reserves).
- Use applications to create documents and presentations (e.g., Microsoft Word, PowerPoint).
- Use applications to share files (e.g., Box, Google Drive).

Required Digital Literacy Skills

In order to be successful in an online course, students should be able to locate, evaluate, apply, create, and communicate information using technology.

Students in this online course should be able to do the following:

- Create, name, compose, upload, and attach documents.
- Download, modify, upload, attach document templates.
- Create, name, design, and upload presentations.
- Access and download Course Reserve readings; read and review PDF documents.
- Access and use a digital textbook.
- Record and upload video taken with a webcam or smartphone.
- Use the library website for scholarly research tasks.
- Search the Internet strategically and assess the credibility of Internet sources.
- Participate in threaded discussions by contributing text responses, uploading images, sharing links.
- Coordinate remote work with peers, which may include contacting each other by e-mail, phone, video conference, or shared document.
- Follow directions to engage with a remote proctor by text, webcam, and audio.
- Use a video player to review content, including pausing and restarting video.

Technical Help and Support

The [SPS Help Desk](#) is available for Faculty, Students, and Staff to support their daily IT needs. For additional technical support, contact the [Northwestern IT Support Center](#).

Permissions

Instructional Materials

This course was developed in partnership with Distance Learning staff in the School of Professional Studies at Northwestern University. Every effort has been made to responsibly acquire instructional materials for this class, by adhering to copyright law, obtaining permission from copyright holders, selecting Open Educational Resources (OERs) and Creative Commons (CC) materials, and using citations to credit the work of others.

Sharing Course Content

Content within this course--including assignment descriptions, exam questions, and other course components--may not be distributed outside of the course, either to other students or on the Internet more broadly.

Student Ownership of Content

Students retain ownership of all content developed while completing this course, as dictated by the university [Copyright Policy](#) ("copyright ownership resides with the Creator(s) of copyrightable works").

Per the Family Educational Rights and Privacy Act ([FERPA](#)), if your instructor wishes to share your work with future students, your permission must be obtained in writing.

Your instructor may limit access to the course after a cutoff date. When you complete the course, please ensure that you have saved all work. You may not be able to return to the course to download your submissions.

Course Schedule

Module 1 – Defining the Problem

Learning Objectives

By the end of this module, you will be able to:

- Define data governance and its role in organizations.
- Recognize, present examples of, and evaluate the most salient ethical issues in contemporary data-driven organizations and their impacts on individuals, governments, and other organizations.
- Compare and contrast the main legislative actions addressing data privacy and individual protections.

Roadmap

Complete the Module 1 Readings and Media
Participate in the Introductions Discussion
Complete the Module 1 Discussion
Join a Data Strategy Team
Familiarize yourself with the Data Governance Case Study Assignment

Required Readings

Eryurek, Evren, Uri Gilad, Valliappa Lakshmanan, Anita Kibunguchy-Grant, and Jessi Ashdown. 2021. *Data Governance: The Definitive Guide*. Sebastopol, CA: O'Reilly Media

- Chapter 1. What Is Data Governance (For guidance on accessing O'Reilly materials refer to Getting Started with O'Reilly Books Online)

Pike, Elizabeth R. 2020. "Defending Data: Toward Ethical Protections and Comprehensive Data Governance." *Emory Law Journal* 69 (4): 687–743.

- An overview of digital and privacy law and the value of ethics in the contemporary linked world, with a framework for evaluating ethical data governance decision-making (55 pages).

Petzold, Bryan, Matthias Roggendorf, Kayvaun Rowshankish, and Christoph Sporleder. 2020. "Designing Data Governance That Delivers Value." McKinsey Digital, June 26, 2020. https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/designing-data-governance-that-delivers-value

Required Media

The 92nd Street Y, New York. 2020. "Netflix's The Social Dilemma: Filmmaker and Tech
Experts in Conversation with Katie Couric." YouTube video, 1:15:18. September 29, 2020.
https://youtu.be/yGi2YKZZNFg.

Couric interviews the director and core participants in the award-winning 2020 Netflix
documentary "The Social Dilemma" (https://www.thesocialdilemma.com/). The
documentary brings together many current and former stakeholders in social media,
including Facebook, Instagram, Pinterest, and Twitter, to discuss the repercussions,
biases, and effects of these apps and algorithms on people and society. "The Social
Dilemma" is proprietary to Netflix and thus unavailable to stream through Northwestern
libraries, however this Couric interview covers the same ground with the same participants.
Only the format is different. ***Students who have Netflix may opt to watch the original
instead.** This video is essential viewing for those interested in AI, algorithmic marketing,
monetization, ethics, or the future.

Eye on Tech. 2020. "What is Data Governance? How Does it Impact Businesses?" YouTube
video, 2:16. February 14, 2020 https://youtu.be/BqdPuwvwPk4.

Data governance keeps your data organized, accessible, and compliant. Watch to learn
what data governance is and how it can be beneficial to businesses.

Adler, John. 2016. "About the Course and Why Data Governance." O'Reilly Media, video, 19:00,
https://www.oreilly.com/videos/data-governance/9781491942352/9781491942352-
video237820/

This video is available from O'Reilly Media to accompany the first chapter of the *Data
Governance* textbook. This first segment introduces and defines data governance and
discusses important concepts and organizational structures in corporate data governance
programs. A well-executed data governance program is critical to organizations that are
aiming to improve data quality and data analytics, migrating to emerging data
technologies, or subject to significant regulation. A transcript and brief description is
available within the O'Reilly Learn platform.

Module 2 – Primary Data Management and Data Quality

Learning Objectives

By the end of this module, you will be able to:

- Define, compare, and contrast data governance and primary data management).
- Compare the concepts of data quality, data integrity, and consistency.
- Define data reliability and justify using a three-pronged approach to achieving reliable,
  high-quality data as part of a data governance strategy.

Roadmap

Complete the Module 2 Readings and Media
Participate in the Module 2 Discussion
Begin the Ethics in Organizations Assignment with your group
Work individually on your First Case Studies Submission

Required Readings

Moses, Barr, Lior Gavish, and Molly Vorwerck. 2022. *Data Quality Fundamentals*. Sebastopol, CA: O'Reilly Media.

- Chapter 1. Why Data Quality Deserves Attention—Now
- Chapter 5. Architecting for Data Reliability

Dennis, Amber Lee. 2022. "Artificial Intelligents Augments Data Management." Dataversity, January 12, 2022. https://www.dataversity.net/artificial-intelligence-augments-data-management/.

Dataversity. 2023. "Data Governance Versus Data Management." October 19, 2023. https://www.dataversity.net/data-governance-vs-data-management/.

Required Media

U.S. Food and Drug Administration. 2020. "Data Quality: Why Do We Care? (1of11) GCP Data Integrity." YouTube video, 33:42. May 27, 2020. https://youtu.be/G3bvgwybzyg .

CDER's Deputy Center Director for Clinical Science Robert J. Temple, M.D., shares case studies and FDA perspectives on why data quality is important in clinical trials.

Module 3 – Data Management Ethics and AI

Learning Objectives

By the end of this module, you will be able to:

- Identify three main ethical concerns in AI.
- Explain GenAI in general terms, and discuss its recent history, advantages and perceived risks.
- Describe the role of data governance in managing ethical concerns in AI and GenAI.
- Analyze the possible future of sentient AI and discuss the ethical implications of AI sentience.

Roadmap

Complete the Module 3 Readings and Media
Participate in Module 3 Discussion
Submit the Ethics in Organizations Assignment (group project) by Sunday
Continue working on your First Case Studies Submission (individual assignment)

Required Readings

Daugherty, Paul P., H. James Wilson, and Rumman Chowdhury. 2019. "Using Artificial Intelligence to Promote Diversity." *MIT Sloan Management Review* 60, no. 2 (Winter). https://mitsmr.com/2DQz2XT

Novak, Richard, and Antonin Pavlicek. 2021. "Data Experts as the Balancing Power of Big Data Ethics." *Information* 12 (3): 97. https://doi.org/10.3390/info12030097

Williams, Alexander. 2023. "What is a Large Language Model?" TheNewStack. https://thenewstack.io/what-is-a-large-language-model/?utm_source=pocket_saves

Required Media

Amanpour and Company. 2023. "Godfather of AI" Geoffrey Hinton Warns of the 'Existential Threat' of AI." May 9, 2023. YouTube Video, 18'8". https://www.youtube.com/watch?v=Y6Sgp7y178k.

> Geoffrey Hinton, considered the godfather of Artificial Intelligence, made headlines with his recent departure from Google. He quit to speak freely and raise awareness about the risks of AI. For more on the dangers and how to manage them, Hinton joins Hari Sreenivasan."

IBM Technology. 2022. "What are Transformers (Machine Learning Model)?"
YouTube video, March 11, 2022, 5:50. https://www.youtube.com/watch?v=ZXiruGOCn9s

> In this brief and extraordinarily clear video on generative AI, Martin Keen defines supervised and unsupervised training, transformer, encoder and decoder, and attention mechanism.

Columbus, Chris, director. 1999. "The Three Laws of Robotics," *Bicentennial Man*. YouTube video, 2:06. https://youtu.be/MsvdXY4lZag.

Module 4 – Digital Trust and Zero Trust

Learning Objectives

By the end of this module, you will be able to:

- Define digital trust as it relates to corporations and their data assets.

- Describe the "zero trust" model, its seven security principles, and its use in building a secure organizational culture.
- Articulate the importance of enterprise digital trust for successful digital transformation.
- Propose a digital trust or zero trust model for building, maintaining, and fostering organizational culture.

Roadmap

Complete the Module 4 Readings and Media
Participate in the Module 4 Discussion
Submit the First Case Studies Submission (individual assignment)
Begin the Digital Trust Assessment group assignment

Required Readings

Abraham, Chon, Ronald R. Sims, Sally Daultrey, Anne Buff, and Anne Fealey. 2019. "How Digital Trust Drives Culture Change." *MIT Sloan Management Review,* Reprint 60430. https://mitsmr.com/2UKeepW . (Please read all four sections of this relatively short paper, including "Investigating Digital Trust," "Driving Culture Change with Incentives," and "A New Awareness of Organizational Culture.")

Albinson, Nancy, Sam Balaji, and Yang Chu. 2019. *Building Digital Trust: Technology Can Lead The Way*. Deloitte Insights. https://www2.deloitte.com/lu/en/pages/innovation/articles/building-long-term-trust-in-digital-technology.html

Buck, Christoph, Christian Olenberger, André Schweizer, Fabiane Völter, and Torsten Eymann. 2021. "Never Trust, Always Verify: A Multivocal Literature Review on Current Knowledge and Research Gaps of Zero-Trust." *Computers & Security* 110 (November): 1-26 (article no. 102436). https://doi.org/10.1016/j.cose.2021.102436

   This paper examines current knowledge in zero trust, both in industry and the academic literature. This is a long article; you may skip Sections 3 and 4.

Vojinovic, Ivana. 2022. "10 of the Biggest Data Breaches in History." DataProt. July 20, 2022. https://dataprot.net/articles/biggest-data-breaches/

Required Media

Kirchner, Florent. 2019. "Cybersecurity & Digital Trust . . . A New Age of Digital Enlightenment!" Filmed November 2018 at TEDxSaclay, Paris, France. YouTube video, 1:05. https://youtu.be/PJ2Jatc6V3k.

   Computer scientist Florent Kirchner explores the relationship between trust, technological advances, education, and community building.

Check Point Software Technologies. 2019 "What is Zero Trust Security?" YouTube video, 4:17.
    November 21, 2019. https://youtu.be/1D5mg9an19o.

    This relatively short animated video gives a good overview of the rationale behind zero trust
    security and describes seven security principles of zero trust.

Module 5 – Law and Regulatory Compliance by Industry

Learning Objectives

By the end of this module, you will be able to:

- Illustrate the importance of enterprise regulatory compliance.
- Analyze real-world data breaches and their impact on consumers and corporations.
- Describe how laws differ based on the regulatory nature of the industry.

Roadmap

Complete the Module 5 Readings and Media
Participate in the Module 5 Discussion
Submit the Digital Trust Assessment

Required Readings

Chen, Lei, Hassan Takabi, and Nhien-An Le-Khac, eds. 2019. *Security, Privacy, and Digital
    Forensics in the Cloud.* Singapore: John Wiley & Sons.

- Chapter 5. Cloud Security & Privacy Management
- Chapter 6. Hacking & Countermeasures in the Cloud
- Chapter 7. Risk Management & Disaster Recovery in the Cloud

Evans, Louis. 2022. "A Simplified Regulatory Checklist for Financial Institutions." Arctic Wolf,
    June 30, 2022. https://arcticwolf.com/resources/blog/a-simplified-regulatory-checklist-for-
    financial-institutions
.
HIPAA Journal. n.d. "HIPAA Compliance Checklist 2022." https://www.hipaajournal.com/hipaa-
    compliance-checklist/

    An up-to-date overview of HIPAA compliance regulations from HIPAA Journal. HIPAA is
    considered the gold standard for health care privacy regulations.

Required Media

List 25. 2017. ""25 BIGGEST Data Breaches Of All Time." 25 BIGGEST Data Breaches Of All Time." YouTube video, 11:52. September 25, 2017. https://youtu.be/fulPBjNfYeg.

"The biggest data breaches in history show us a terrifying reality: our data is not as secure as we would like it to be. All it takes is for one savvy coder, careless leak, or even a physical breach for thousands and even millions of people to be at danger of identity theft or worse."

Module 6 – Global Data and Intellectual Property Protection Laws

Learning Objectives

By the end of this module, you will be able to:

- Describe how US and European privacy and data protection laws differ.
- Contrast countries with the most stringent data privacy and data protection laws in the world with those with the most lax such laws.
- Discuss the privacy and data protection governing bodies and safeguards in place to ensure compliance with laws.
- Examine real-world privacy violations at global corporations and their financial and consumer trust erosion–related outcomes.
- Define the core terminology and scope of intellectual property (IP), including copyright, trademark, registered designs, and patents.
- Analyze the issues around intellectual property (IP) protections and AI.

Roadmap

Complete the Module 6 Readings and Media
Participate in the Module 6 Discussion
Complete Digital Trust Assessment Peer Review Completion
Begin Global Data Breach Analysis Assignment

Required Readings

DLA Piper. 2022-2024. "Data Protection Laws of the World."
     https://www.dlapiperdataprotection.com/

This website starts with a clickable world map. Clicking on any of the countries or regions leads to a description of their privacy laws as of the latest website update.

Global Legal Group. 2022. "Data Protection Laws and Regulations USA, 2022." ICLG.com. Last updated July 7, 2023. https://iclg.com/practice-areas/data-protection-laws-and-regulations/usa

    This website is frequently updated with global data protection and privacy laws.

World Intellectual Property Organization (WIPO). 2020. *What is Intellectual Property?* Geneva, Switzerland: WIPO
Publication. https://www.wipo.int/edocs/pubdocs/en/wipo_pub_450_2020.pdf

World Intellectual Property Organization (WIPO). 2022. "What is Intellectual Property?" https://www.wipo.int/about-ip/en/

Wills, Kathleen. 2022. "AI Around the World: Intellectual Property Law Considerations and Beyond," *Journal of the Patent and Trademark Office Society,* Vol. 102, 186.

Required Media

Privacy Kitchen. 2021. "What are the 7 Principles of GDPR?" YouTube video, September 23, 2021. https://youtu.be/NcHSD3fWJiQ?si=xEnCCg6559lXpUYv

Privacy Kitchen. 2020. "10 Steps to GDPR Compliance." YouTube video.
https://youtu.be/tPGsm9-55O4?si=nytODiahtfEOZe1-one

Module 7 – Data Lineage and Data Provenance

Learning Objectives

By the end of this module, you will be able to:
- Explain the role of data lineage and data provenance in data governance.
- Identify the essential steps and best practices in developing a data lineage.
- Discuss why data lineage and data provenance are even more important in the cloud environment.
- Articulate the benefits of successful data provenance implementation for real-world case studies.

Roadmap
Complete the Module 7 Readings and Media
Participate in the Module 7 Discussion
Work with your group on the Global Data Breach Analysis Assignment
Finish up your Second Case Studies Submission

Required Readings

Eryurek, Evren, Uri Gilad, Valliappa Lakshmanan, Anita Kibunguchy-Grant, and Jessi Ashdown. 2021. *Data Governance: The Definitive Guide*. Sebastopol, CA: O'Reilly Media.

- Chapter 4. Data Governance over a Data Lifecycle
- Chapter 8. Monitoring

Google Cloud. 2020. "Tracking Provenance and Lineage Metadata for Healthcare Data." Last updated May 15, 2020. https://cloud.google.com/architecture/tracking-provenance-and-lineage-metadata-for-healthcare-data

Resources and best practices for tracking health care data on a succinct web page from Google.

Gaur, Chandan. 2022. "Guide to Data Lineage Best Practices and Techniques." http://www.xenonstack.com/insights/data-lineage.

An overview of data lineage best practices, plus discussion of some data lineage tools.

Ghosh, Paramita (Guha). 2021. "Data Governance in the Cloud." Dataversity, April 13, 2021. https://www.dataversity.net/data-governance-cloud/?_gl=1*1t4wpa3*_ga*MTM0Mjg0MTc4MC4xNjYxODA0NzU1*_ga_WPKT43C7B2*MTY2MTgwNDc1NS4xLjEuMTY2MTgwNDc1NS4wLjAuMA..

Google Cloud. n.d. *Principles and Best Practices for Data Governance in the Cloud*. https://services.google.com/fh/files/misc/principles_best_practices_for_data-governance.pdf

Module 8 – Cybersecurity and Network Security

Learning Objectives

By the end of this module, you will be able to:
- Describe the main categories and principles of cybersecurity.
- Define the roles of security officers and personnel.
- Investigate automation and technology for compliance and oversight.
- Summarize legislation and trends relevant to cybersecurity.
- List the key components of any cybersecurity or network security platform.

Roadmap

Complete the Module 8 Readings and Media
Participate in the Module 8 Discussion
Submit the Data Governance Case Study Assignment
Start working on the Data Governance Framework

Required Readings

Sobers, Rob. 2022. "166 Cybersecurity Statistics and Trends [Updated 2022]." Varonis. Last
    updated July 8, 2022. https://www.varonis.com/blog/cybersecurity-statistics .

    Up-to-date list of the latest global cybersecurity statistics and incidents, with many links.

McKinsey & Company. 2019. *Perspectives on Transforming Cybersecurity*. March 2019.
    https://www.mckinsey.com/~/media/McKinsey/McKinsey%20Solutions/Cyber%20Solutions/
    Perspectives%20on%20transforming%20cybersecurity/Transforming%20cybersecurity_Ma
    rch2019.ashx

Boehm, Jim, Nick Curcio, Lucy, Shenton, and Tobias Stahle. 2019. *The Risk-Based Approach
    to Cybersecurity*. McKinsey & Company. October 2019.
    https://www.mckinsey.com/~/media/McKinsey/Business%20Functions/Risk/Our%20Insight
    s/The%20risk%20based%20approach%20to%20cybersecurity/The-risk-based-approach-
    to-cybersecurity.ashx

Liu, Kathy. 2024. "Cybersecurity is a Social Issue. Here's How We Get Young People to Rally
    for It." Centre for Cybersecurity, World Economci Forum. Last modified February 15, 2024.
    https://www.weforum.org/agenda/2024/02/young-people-cybersecurity-social-issue/

Collard, Anna Marie. 2024. "4 Ways to Future-proof Against Deepfakes in 2024 and Beyond."
    Centre for the Fourth Industrial Revolution, World Economic Forum. Last modified
    February 12, 2024. https://www.weforum.org/agenda/2024/02/4-ways-to-future-proof-
    against-deepfakes-in-2024-and-beyond/

Required Media

Palo Alto Networks Ignite. 2018. "Automating Cybersecurity." YouTube video, 31:11. October
    11, 2019. https://youtu.be/OSiiYrrqZWo.

    Speaker outlines the core cybersecurity problems and proposes a zero trust model with
    automated cybersecurity at the core.

Module 9 – Encryption, Blockchain, and Emerging Technologies

Learning Objectives

By the end of this module, you will be able to:

- Describe the essential role of encryption in managing consumer and company data.

- Compare and contrast blockchain to traditional data storage systems for data privacy and security solutions.
- Analyze the environmental impact of blockchain and cryptocurrencies along with the viability of possible solutions.
- Identify and analyze a real-world example of a company updating its encryption policies in anticipation of future directions of data protection and storage technology.

Roadmap

Complete the Module 9 Readings and Media
Participate in the Module 9 Discussion

Required Readings

Sears, John. 2022. "Encryption 101: Your Complete Guide." NordLocker. May 18, 2022. https://nordlocker.com/blog/encryption/ .

DeGroot, Juliana. 2022. "What is Data Encryption? Definition, Best Practices, and More." Digital Guardian. March 14, 2022. https://digitalguardian.com/blog/what-data-encryption .

Global Partners Digital. n.d. "World Map of Encryption Laws and Policies." https://www.gp-digital.org/world-map-of-encryption/ .

A site with a clickable map offering an assessment view and a law and policy view of global encryption by countries and regions.

Kumari, Anitha, and Chitra N. Devi. 2022. "The Impact of FinTech and Blockchain Technologies on Banking and Financial Services." *Technology Innovation Management Review* 12 (1/2): 1–11. https://timreview.ca/article/1481 .

Required Media

TechRepublic. 2018. "How Blockchain Encryption Works." YouTube video, 2:58. January 26, 2018. https://www.youtube.com/watch?v=j2Or0DsUYkI.

Motherboard. 2022. "What Is Bitcoin's Impact on the Environment?" *Vice*. YouTube video, 26:46. https://www.youtube.com/watch?v=1bxx1jFSlMI.
Mining Bitcoin takes an enormous amount of energy, creating a conflict between environmentalists and those who mine Bitcoin. Some miners are arguing that they can create environmentally friendly cryptocurrency. I post the Vice video and leave the conclusion up to you.

Module 10 – Applying your knowledge: Building a Data Governance Framework

Learning Objectives

By the end of this module, you will be able to:

- Apply Knowledge to design a Data Governance Framework

Roadmap

Complete the Module 10 Readings and Media
Participate in the Module 10 Discussion -- Wrap Up
Complete the Data Governance Framework

Required Readings

Petzold, Bryan, Matthias Roggendorf, Kayvaun Rowshankish, and Christoph Sporleder. 2020. "Designing Data Governance that Delivers Value." McKinsey Digital, June 26, 2020. https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/designing-data-governance-that-delivers-value .

   From Week 1: A relatively brief overview of basic principles in data governance.

Paolini, Daniel J. 2016. "Data Governance Framework Implementation Plan." City of Philadelphia Department of Behavioral Health and Intellectual disAbility Services, February 29, 2016. https://dbhids.org/wp-content/uploads/2017/09/OCIO_DBHIDS-Data-Governance-Framework-Implementation-Plan-v1.pdf .

   A data governance plan for a department within the City of Philadelphia.

Spotts, Peter. 2023. "Why Non-invasive Data Governance is the Best Approach to Use." TechTarget Bookshelf. https://www.techtarget.com/searchdatamanagement/feature/