# INTA 2040

## Science, Technology, and International Affairs

**Term:** Fall 2026 **Credit Hours:** 3
**Time:** [TBD] **Location:** [TBD]

## Instructor Information

**Instructor:** Dr. Juljan Krause
**Email:** jkrause@gatech.edu
**Office:** Habersham 315
**Office Hours:** [TBD]

## Course Description

*How do science and technology shape strategic competition between states, and how do international politics and geopolitical pressure shape the development and control of science and technology?*

From nuclear weapons to the internet to Artificial Intelligence, science and technology have always shaped the balance of power between states. Today, strategic competition over emerging technologies is reshaping the international system in real time. States race to lead in AI, quantum computing, semiconductors, and biotechnology. They deploy export controls, industrial policy, and science diplomacy to gain competitive advantage, at times struggling to govern technologies that evolve faster than institutions can adapt.

This course examines the reciprocal relationship between science, technology, and international affairs. How exactly do scientific and technological capabilities translate into strategic advantage? How do states compete to develop, control, and govern critical technologies? And how do alliance structures, economic interdependence, and institutional frameworks shape the trajectory of science and technology?

Topics include nuclear weapons and arms control, AI and great power competition, semiconductor supply chains, cybersecurity, quantum technologies, science policy as statecraft, and the governance challenges posed by rapid technological change. The course assumes no prior technical background; students from all disciplines will develop the analytical vocabulary to assess the strategic significance of any technology, including those still emerging.

## Course Learning Outcomes

Upon successful completion of this course, you will be able to:

1. Explain how scientific and technological developments (re)shape strategic competition between states and the structure of the international system.
2. Identify the key actors, such as states, firms, international institutions, and scientific communities, that all influence science and technology policy, and analyze their interests and interactions.
3. Apply a structured analytical framework to assess the strategic significance of any technology.
4. Evaluate the tools states use to compete over and govern critical technologies, including industrial policy, export controls, arms control, and science diplomacy.
5. Communicate analysis of a science and technology issue clearly, concisely, and professionally.

## Required Course Materials

There is no required textbook. Readings will be drawn from academic articles, policy reports, government documents, and current affairs publications, and will be posted on Canvas each week. You should expect approximately 40–60 pages of reading per week.

### Recommended Background Reading

The following are **not required** but are recommended for students who wish to build additional context before or during the course:

- Justin B. Bullock et al. (eds.), *The Oxford Handbook of AI Governance* (2024). Comprehensive anthology that examines how AI interacts with and influences governance systems, and how governance systems influence and interact with AI.
- Laura DeNardis, *The Internet in Everything* (2020). An accessible introduction to the internet's evolution from a communication system to an advanced command-and-control network indispensable to national security.
- Chris Miller, *Chip War: The Fight for the World's Most Critical Technology* (2022). A narrative history of the semiconductor industry and its geopolitical significance.

## Course Structure

The course is organized into four thematic blocks that build progressively from foundational concepts through case studies to synthesis:

### Block I: Foundations — Weeks 1–3

What makes science and technology strategic? This block introduces the core analytical concepts of network effects, dual-use technology, innovation and diffusion, strategic competition, and geopolitics. It examines the actors who shape technology policy: states, firms, international institutions, and scientific communities. It also considers science policy itself as an instrument of statecraft, i.e. how national R&D systems, talent strategies, and research security policies function as tools of strategic competition.

### Block II: The Nuclear Case — Weeks 4–5

Nuclear weapons are the original strategic technology and the most consequential case of technology governance in modern history. This block examines the development of nuclear weapons, the logic of deterrence, and the architecture of arms control and nonproliferation. It establishes a reference point that recurs throughout the course: when we later encounter AI or cyber, we can ask what lessons nuclear governance offers.

### Block III: The International Technology Landscape — Weeks 6–13

The core of the course. Each week applies a common analytical lens to a different technology domain: *What is the technology and how does it work? Why is it strategically significant? Who are the key actors? What governance exists, or doesn't? What are the core tensions and trade-offs?*

Topics include:

- **Artificial Intelligence** (3–4 weeks): capabilities and limitations; AI and great power competition; compute, data, and talent as strategic resources; AI governance and the autonomous weapons debate.
- **Semiconductors and supply chains**: chokepoints, industrial policy, and the geopolitics of manufacturing.
- **Internet technologies and governance**: the architecture of the internet, the multistakeholder vs. multilateral governance debate, competing visions for global infrastructure (including New IP), and the "splinternet" question.
- **Cybersecurity and state conflict in cyberspace**: offensive and defensive cyber operations, critical infrastructure protection, deterrence, and international norms.
- **Quantum technologies**: computing, sensing, and communications; implications for cryptography and national security.
- **Additional topics** drawn from: biotechnology and health security, space and dual-use systems, or energy security.

**Block IV: Synthesis** **Weeks 14–15**

What patterns emerge across the cases? How do states manage the tension between openness and security, innovation and control? This block draws together the threads of the course and looks ahead: what does strategic competition over emerging technologies mean for the future of the international system?

## Grading Policy

| Component | Weight | Description |
|---|---|---|
| **Reading Quizzes** | 15% | Canvas-based quizzes on assigned readings |
| **Participation & Engagement** | 10% | Attendance, in-class contributions, and discussion |
| **Midterm Exam** | 20% | Short-answer and essay questions |
| **Analytical Essay** | 25% | Written analysis of a technology and its international significance |
| **Final Exam** | 30% | Cumulative short-answer and essay questions |

At Georgia Tech, final course grades are awarded on a scale of A–F with no +/- grades permitted. Your final grade will be assigned as a letter grade according to the following scale:

| | |
|---|---|
| A | 90–100% |
| B | 80–89% |
| C | 70–79% |
| D | 60–69% |
| F | 0–59% |

### Description of Graded Components

**Reading Quizzes (15%).** Short quizzes administered on Canvas, typically due before each class meeting. These assess your engagement with the assigned readings and ensure that everyone arrives prepared for discussion. Quizzes will include multiple-choice and short-answer questions. The lowest two quiz scores will be dropped.

**Participation & Engagement (10%).** Active engagement is essential in a course that spans technical and policy perspectives. Participation will be assessed holistically based on attendance, quality of contributions to in-class discussion, and engagement with peers. You do not need to speak frequently to earn full marks; quality, preparation, and thoughtful engagement matter more than volume.

**Midterm Exam (20%).** The exam will consist of short-answer questions and one essay. You will be assessed on your ability to apply course concepts, not on memorization of facts.

**Analytical Essay (25%).** A take-home essay of 1,000–1,200 words in which you select an emerging technology and analyze its significance for international affairs. You should address what makes the technology strategically important, which actors are competing to develop or control it, and what governance challenges it presents. You are expected to draw on course concepts

and frameworks, not simply describe the technology. A detailed assignment sheet and grading rubric will be provided. Due approximately Week 11.

**Final Exam (30%).** A cumulative examination with emphasis on Blocks III and IV (the international technology landscape and synthesis). The exam will test your ability to apply the analytical framework across cases and to draw connections between different technology domains. Format: short-answer questions and an essay from a choice of prompts. The final exam will be scheduled during the official Georgia Tech finals period.

## Course Policies

### Attendance and Participation

Regular attendance is expected. The course moves quickly, and much of the value comes from in-class discussion and exercises that cannot be replicated from slides alone. If you must miss a class, please notify me in advance whenever possible. If you are absent because of participation in approved Institute activities (such as field trips, professional conferences, athletic events, and off-campus interviews) you will of course be given the opportunity to make up the work missed during your absences.

Review Institute expectations and restrictions related to attendance, including information about excused absences.

### Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review Georgia Tech's Honor Code and the student Code of Conduct.

Any student suspected of cheating or plagiarism on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

### Core IMPACTS

**This is a Core IMPACTS course that is part of the Social Sciences area.**

Core IMPACTS refers to the core curriculum, which provides students with essential knowledge in foundational academic areas. This course will help master course content, and support students' broad academic and career goals.

This course should direct students toward a broad Orienting Question:

- How do I understand human experiences and connections?

Completion of this course should enable students to meet the following Learning Outcomes:

- Students will effectively analyze the complexity of human behavior, and how historical, economic, political, social or geographic relationships develop, persist or change.

Course content, activities and exercises in this course should help students develop the following Career-Ready Competencies:

- Intercultural Competence

- Perspective-Taking
- Persuasion

**Accommodations for Students with Disabilities**

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

**Student-Faculty Expectations Agreement**

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgment, and responsibility between faculty members and the student body. The Student-Faculty Expectations articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

**Use of Generative AI**

You may use AI tools (such as ChatGPT, Claude, or similar) as research aids, for brainstorming, and for refining your writing. However, all submitted work must reflect your own analysis and be written in your own voice. If you use AI assistance in preparing an assignment, you must briefly acknowledge it and explain how you used it (e.g., "I used ChatGPT to help me identify relevant sources on quantum export controls"). AI-generated text submitted as your own work constitutes an academic integrity violation.

This course is, in part, about the strategic significance of AI. You are encouraged to think critically about AI tools as you use them: their capabilities, their limitations, and the policy questions they raise.

**Late work, extensions, and unexpected events**

Deadlines are part of the learning design in this course: they help you plan, help me grade fairly, and keep the class moving together. If something disrupts your ability to meet a deadline, please email me *as soon as reasonably possible* (ideally before the deadline) with a brief description of the situation and a proposed plan.

**Extensions.** I can often grant short extensions for good-faith reasons when requested in advance. In most cases, I will ask for documentation. You do not need to share sensitive details; when documentation is requested, a brief note from an appropriate authority (e.g., Student Health Services, a medical provider, the Dean of Students, or an accessibility/academic support office) confirming the situation is sufficient.

**Late submissions.** Unless an extension is approved, late work will receive a penalty of 5 percentage points per 24 hours (including weekends), up to 72 hours. After 72 hours, the assignment will receive a zero, except in cases of documented emergencies or official accommodations.

### Inclement Weather and Digital Learning Days

If a weather-related event or other emergency affects campus operations, the course will pivot to synchronous online delivery via Zoom/Canvas. In such cases, an announcement will be posted on Canvas with the relevant link and any adjustments to the session plan.

### Subject to Change Statement

The syllabus and course schedule may be subject to change. Changes will be communicated via email and/or the Canvas announcement tool. It is your responsibility to check your email messages and keep an eye on course announcements.

## Campus Resources for Students

The following resources will help you succeed in class:

### Undergraduate Student Academic Success Resources

Academic Support: Academic Success and Advising (a unit in the Office of Undergraduate Education & Student Success) provides free support. You can attend scheduled supplemental review (PLUS) sessions, stop by Drop-In Tutoring, or schedule a one-on-one appointment through Knack. To explore what options work best for you, please visit Academic Success and Advising, email tutoring@gatech.edu, or visit the Clough Undergraduate Learning Commons, Suite 283.

### Graduate Student Academic and Professional Success Resources

A list of resources for graduate students is given on the Office of Graduate and Postdoctoral Education website. Specific information for current graduate students includes

- Academic Resources such as the Communications Center, Language Institute, Library, Catalog, Registrar, resources for conducting research, Advocacy and Conflict Resolution resources, and how to manage unexpected situations that may impact your academic performance;
- Student Resources such as Campus Services, Child Care/Family programs, Health & Wellness, Career Services, and the Student Resource Guide; and
- Professional Development such as the programming from the Career Center and other professional development resources and events

### Student Well-Being

At Georgia Tech, we are concerned about your overall physical, social, and mental well-being. A comprehensive list of wellness related resources has been compiled and maintained by the Office of the Vice President for Student Engagement and Well-being.

**Note on the syllabus.** This syllabus provides a high-level overview of the course. A detailed weekly schedule, including specific topics, readings, and due dates, will be posted on Canvas well before the start of the semester and may be updated as the course progresses.