

Note: **PROSPECTIVE SYLLABUS** based on last time course was offered. Final syllabus, with updated schedule and revised readings, will be available by late August

Science and Technology in Modern East Asia (STSC 2146/EALC 2502)

Fall 2024

Monday and Wednesday, 1:45-3:14 PM, Classroom TBD

Professor: John Kanbayashi (john.kanbayashi@sas.upenn.edu)

Description

Technology from East Asia is ubiquitous in everyday life in the 21st century. You may be reading these very words on a device designed or assembled in Japan, China, South Korea, or Taiwan. The region, now a global center of research and innovation, contains some of the modern world's most impressive technological and scientific achievements. It also exhibits some of the most distressing—from mass facial recognition surveillance in China to nuclear disaster in Japan. This course explores how this state of affairs has taken shape from the 19th century through the present. Topics include industrialization, military technology, science and the rise of nationalism, the proliferation of consumer electronics, and environmental engineering in a warming world.

This course will introduce students to diverse scientific and technological developments in East Asia with a focus on the mid-19th century through the present. Students will study how societies in China, Japan, and Korea, have both made and been remade by projects of knowledge production and application. Through scholarly readings, historical documents, visual material, and film, we will consider what aspects of this history are distinctive to East Asia or shared with the rest of the world. The course's format will consist of two weekly meetings, one mostly devoted to lecture and one focused on discussion. Assignments will include a map and timeline quiz, an "artifact biography" focusing on a particular piece of East Asian technology, and an original research project in the form of a final paper or equivalent in other media. Assessment will combine evaluation of these assignments with attendance and participation in weekly course site postings and classroom discussion. By the end of the semester, students will be prepared to critically examine the East Asian past and present and to imagine possible technological futures. Along with a deeper understanding of modern East Asian societies and the history of science and technology as a field, students will have honed analytical skills necessary to make sense of complex source material and to craft an original argument grounded in research.

Expectations and Policies

All students are expected to come to class fully prepared to participate. I welcome disagreement—with me, the authors of the work we read, and classmates—but ask that you engage with respect and in good faith. In keeping with Penn's Code of Academic Integrity, all assignments for this class must be your own original work. There will have several in-class freewriting sessions to prepare you for work on your projects. Use of generative AI tools is permitted for the final drafts of assignments but must be disclosed and described in a cover sheet.

Engaged participation in every class meeting is a baseline expectation. All students are additionally asked to meet with me at least once in office hours (we'll find a time if you have a conflict) within the first month of the semester. Assignments submitted late will be assessed a half letter grade reduction (e.g. A to A-) for each 24 hours past the deadline. All students are entitled one unexcused absence, no questions asked. After that, each unexcused recitation absence will result in a four percentage-point deduction from your active attendance grade (1% from the total grade). Students

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who do not use this “freebie” absence will receive extra attendance credit (1% towards the final grade) at the end of the semester.

You may use laptops or tablets to take notes or refer to readings, but I urge you to either disable your wifi for the duration of class or, if possible, take notes by hand. A robust body of research shows that students focus better and learn more when not using electronic devices in class. No browsing, messaging, shopping, or watching videos. Please put cell phones away. Repeated violations of this policy may result in a deduction from your grade.

Assessment

Your grade will be determined as follows:

Active attendance	25%
Weekly postings	10%
Map and timeline quiz	10%
Object biography	20%
Final presentation	10%
Final project	25%

Course Schedule (An asterisk (*) indicates a primary source; all readings on course website)

Week 1—What does it mean to study science, technology, and society in East Asia?

August 28—Course overview

Week 2—Modernity in technology and East Asian history

September 2—Science and technology as concept and history

September 4—Modern East Asian history: a brief survey

*Hu Shih, “The Civilizations of the East and the West,” (1928)

Melvin Kranzberg, “Technology and History: Kranzberg’s Laws,” (1986)

Recommended: Jerry Dennerline, “Modern East Asia: A History,” in *East Asia in the World* (2015)

Week 2—Ancient Chinese inventions and scientific revolutions

September 9—Lecture

September 11—Discussion

*Sung Ying-Hsing, *Chinese Technology in the Seventeenth Century: T’ien-Kung K’ai-Wu*, trans. E-tu Zen Sun and Shiou-chuan Sun (1966 [1637]), selections

Nathan Sivin, “Why the Scientific Revolution Did Not Take Place in China—or Didn’t it?,” *Chinese Science* (1982)

Dagmar Schäfer, *The Crafting of the 10,000 Things: Knowledge and Technology in Seventeenth-Century China* (2011), selections.

Week 3—Pre-modern vernacular technologies

September 16—MAP AND TIMELINE QUIZ; Lecture

September 18—Discussion

Francesca Bray, “Technics and Civilization in Late Imperial China: An Essay in the Cultural History of Technology” (1998)

Yulia Frumer, “Translating Time: Habits of Western-Style Timekeeping in Late Edo Japan,” (2014)

Hyeok Hwan Kang, “Reverse Engineering as History and Method: The Portuguese *Espingarda* in Choson Korea,” (2022)

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Week 4—Military and industry

September 23—Lecture; object biography research guide

September 25—Discussion; visual source roundtable

*Fukuzawa Yukichi, “Western Civilization as our Goal,” in *An Outline of a Theory of Civilization* (1875)
[MIT Visualizing Cultures](#) visual sources on Opium Wars, First Sino-Japanese War, Russo-Japanese War (to be assigned and discussed in class)

Richard Samuels, “The Ideological Basis of Japanese Technonationalism” in *“Rich Nation, Strong Army”: National Security and the Technological Transformation of Japan* (1994)

Meng Yue, “Hybrid Science versus Modernity: The Practice of the Jiangnan Arsenal, 1864–1897,” (1999)

Week 5—Transfers, transport, and engineering

September 30—Lecture; object biography freewrite

October 2—Discussion

Chang Jui-te, “Technology Transfer in Modern China: The Case of Railway Enterprises in Central China and Manchuria,” in *Manchurian Railways and the Opening of China: An International History* (2010)

Steven J. Ericson, “Importing Locomotives in Meiji Japan: International Business and Technology Transfer in the Railroad Industry,” (1998)

Hsien-Chun Wang, “Discovering Steam Power in China, 1840s–1860s,”(2010)

Week 6—Agriculture: national rice, colonial rice

October 7—Lecture

October 9—Discussion

David Biggs, “Promiscuous Transmission and Encapsulated Knowledge: A Material-Semiotic Approach to Modern Rice in the Mekong Delta” (2015)

Hyungsub Choi, “Imported Machines in the Garden: The *Kyōngun’gi* (Power Tiller) and Agricultural Modernization in South Korea” (2017)

Sigrid Schmalzer, “Yuan Longping: ‘Intellectual Peasant,’” in *Red Revolution, Green Revolution* (2016)

October 11 1—Object Biography due to Canvas by 11:59 PM

Week 7—Constructing and fueling Japan’s technological empire

October 14—NO CLASS (Indigenous Peoples’ Day)

October 16—Discussion

Aaron Stephen Moore, “‘The Yalu River Era of Developing Asia’: Japanese Expertise, Colonial Power, and the Construction of Sup’ung Dam” (2013)

Victor Seow, “Vertical Natures” in *Carbon Technocracy: Energy Regimes in Modern East Asia* (2021)

Brett Walker, “Meiji Modernization, Scientific Agriculture, and the Destruction of Japan’s Hokkaido Wolf” (2004)

Week 8—The Asia-Pacific War

October 21—Lecture

October 23—Discussion

Hayao Miyazaki, *The Wind Rises* (2013), 126 minutes.

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Micah Muscolino, *The Ecology of War in China: Henan Province, the Yellow River, and Beyond, 1938-1950*, selections.

William M Tsutsui, "Landscapes in the Dark Valley: Toward an Environmental History of Wartime Japan," (2003)

Week 9—The home as laboratory: domestic technologies

October 28—Lecture

October 30—Discussion; Final project freewrite

David Fedman, "The Ondol Problem and the Politics of Forest Conservation in Colonial Korea," (2018)

Helen Macnaughtan, "Building up Steam as Consumers: Women, Rice Cookers and the Consumption of Everyday Household Goods in Japan" in *The Historical Consumer: Consumption and Everyday Life in Japan 1850-2000* (2011)

Jordan Sand, "The Housewife's Laboratory," in *House and Home in Modern Japan: Architecture, Domestic Space, and Bourgeois Culture, 1880-1930* (2003)

Yuzo Takahashi, "A Network of Tinkerers: The Advent of the Radio and Television Receiver Industry in Japan," (2000)

Week 10—Leaps and miracles, technologies of development

November 4—Lecture

November 6—Discussion

Jessamyn Abel, "Technologies of Cold War Diplomacy: Transforming Postwar Japan," *Technology and Culture* (2021)

Victor Seow, "Socialist Industrialization" in *Carbon Technocracy: Energy Regimes in Modern East Asia* (2021)

Honghong Tinn, "Modeling Computers and Computer Models: Manufacturing Economic-Planning Projects in Cold War Taiwan, 1959-1968," (2018)

Week 11—Energy in East Asia's Anthropocene

November 11—Lecture

November 13—Discussion

* Kazuto Tatsuta, *Ichii-F: A Worker's Graphic Memoir of the Fukushima Nuclear Power Plant* (2017), selections

Eriko Arita, "From Aboriginal land to Japan's nuclear reactors," *The Japan Times* (Feb. 19, 2012).

Hsi-Wen Chang (Lengmengman Rovaniyaw), "Indigenous Attitudes towards Nuclear Waste in Taiwan," (2020)

Week 12—Robots and automation

November 18—Lecture; Final project freewrite II

November 20—Discussion

Yu Huang and Naubahar Sharif, "From 'Labor Dividend' to 'Robot Dividend': Technological Change and Workers' Power in South China," (2017)

Jennifer Robertson, *Robo Sapiens Japonicus: Robots, Gender, Family, and the Japanese Nation* (2018), selections

Kai Strittmatter, *We Have Been Harmonized: Life in China's Surveillance State* (2021), selections.

November 25, 27—Thanksgiving Break, NO CLASS

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Week 13—A Warming World

December 2—Urban Environments

December 4—Geophysical and Geopolitical Entanglements

*Chai Jing, *Under the Dome* (2015), 104 minutes

Scott O'Bryan, "The Climatic Dilemmas of Build Environments: Tokyo, Heat Islands, and Urban Adaptation," (2015)

Jerry C. Zee, "Machine Sky: Social and Terrestrial Engineering in a Chinese Weather System," (2020)

Week 14—Final Presentations

December 9— Final Presentations

May 1—Lecture and Discussion

December 11—Final Project due to Canvas by 11:59 PM