



**WISCONSIN**  
UNIVERSITY OF WISCONSIN-MADISON

**History of Science 350-002**

**The History of Science, Technology, and Medicine in China**

Dr. Alexander Statman

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Office hours: Thursday, 12:15PM - 2PM

Spring 2021

Tuesday / Thursday 11:00AM – 12:15PM

Modality: remote / online

The history of science, technology, and medicine in China goes back more than three thousand years, boasting extraordinary discoveries and inventions such as gunpowder, printing, and the compass. Today, some look to traditions like acupuncture and fengshui as a source of ancient wisdom; others think of recent efforts in cyber-weapons and human cloning as the science of the future. In this course, we will study the long history of science technology, and medicine in China to learn how the control and understanding of the natural world has always been contested.

The course begins in early antiquity, proceeds through the late imperial period, and concludes in modern China. Topics include ancient knowledge practices and comparisons with other classical cultures; global exchange and the origins of the modern economy; and the legacy of imperialism and nationalism for China today. Readings are focused on primary sources in English translation, such as scientific texts, philosophical dialogues, travelogues, world maps, and more.

### **Learning Objectives**

This course aims to achieve educational goals related both to specific historical content and to broadly transferable skills.

In terms of content, students will learn to:

- 1) Understand the historical development of science, technology, and medicine in human culture
- 1) Appreciate the diversity of Chinese history, from early antiquity to the present day
- 1) Approach contemporary debates about global science from a historically informed perspective

In terms of skills, students will learn to:

- 1) Research, interpret, analyze, and criticize different kinds of sources
- 1) Engage and empathize with diverse viewpoints that are different from your own
- 1) Construct and defend your own arguments about history

## **Grading**

Grades are based on weekly online participation both in synchronous discussions (25%) and written responses (25%), as well as three formal writing assignments (50%).

### *Oral Participation (weekly, remote, 25%)*

Class meets twice a week synchronously over UW-Madison Zoom. Tuesday meetings include both lecture and discussion. Thursday meetings, led jointly with a student, are focused on primary source discussion. Please turn on video if at all possible.

### *Written Participation (weekly, ½ page, 25%)*

Each week, a short response post is due to canvas by Midnight Wednesday. It must demonstrate engagement with both the class discussion and the reading assignment – beyond that, creativity is permitted and encouraged.

### *Unit Papers (week 5, week 10, week 15; 3-5 pages each; 50%)*

Referring to at least two primary sources that we have read in class, respond to your choice of one of the assigned prompts. Unit Papers prompts, requirements, and strategies will be discussed further in class.

## **Credit Policy**

The credit standard for this 3-credit course is met by an expectation of a total of 135 hours of student engagement with the course's learning activities (at least 45 hours per credit or 9 hours per week), which include regularly scheduled meeting times, guided individual research, dedicated online time, reading, writing, individual consultations with the instructor, and other student work as described in the syllabus.

## **Writing Intensive Option**

Undergraduates may select to take this course for intensive writing credit. For those exercising this option, the three Unit Papers are replaced with a longer synthetic paper using multiple primary sources from the course reading, to be written in consultation with the instructor (*week 15, 10-15 pages, 50%*).

## **Graduate Student Option**

Graduate students meet with the instructor biweekly to review supplementary historiography readings in the historiography. The three Unit Papers are replaced with a longer research using both primary and secondary sources drawn from outside the course reading (*week 15, 12-15 pages, 50%*).

## **Accommodations**

COVID-19: The university of Wisconsin is strategically and systematically deploying four modes of instruction in terms affected by the ongoing COVID-19 pandemic: in-person instruction, hybrid instruction, remote instruction and online instruction. This course is classified as remote instruction, i.e., course sections that in normal circumstances would be offered in-person and that have been converted for remote delivery in response to the COVID-19 pandemic. All reasonable accommodations will be made for students who are otherwise affected.

Disabilities: The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform faculty of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Faculty will work either directly with the student or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA.

Religious observances: The University of Wisconsin-Madison supports accommodation of religious observances that might conflict with the course schedule. Students must notify the instructor within the first two weeks of class of the specific days or dates on which they request relief. Make-ups may be scheduled before or after the regularly scheduled requirements. It is understood that instructors may set reasonable limits on the total number of days claimed by any one student.

## Schedule

Readings should be completed by Wednesday of the week under which they are listed. Those prefaced with a \* are required for graduate students. All assignments are posted to canvas.

### **Introduction (1/26-1-28): The History of Chinese Science**

“China Brings Moon Rocks to Earth, and a New Era of Competition to Space,” *New York Times* (2020)

“The Chinese Scientific Genius,” *The UNESCO Courier* (1988), 1-22

\*Nathan Sivin, “Why the Scientific Revolution Did Not Take Place in China – Or Didn't It?” *Chinese Science* (1982/2005), 1-22

\*Joseph Needham, “The Roles of Europe and China in the Evolution of Oecumenical Science,” *Journal of Asian History* (1967), 3-32

### **Unit I: Traditional Science in Ancient China**

#### **Week 2 (2/2-2/4): The Origins of Science**

Oracle-bone inscriptions of the late Shang Dynasty” (1<sup>st</sup> m. BCE), 3-23

*Book of Changes* (1<sup>st</sup>-2<sup>nd</sup> millennium BCE), 318-325

\*Shigeru Nakayama, “Characteristics of Chinese Astrology” *Isis* (1966), 442-454

\*A.C. Graham, *Yin-Yang and the Nature of Correlative Thinking* (1986), 1-15, 25-66

#### **Week 3 (2/9-2/11): Natural Philosophy in the Warring States**

Confucius, *Analects* (5<sup>th</sup> c. BCE), 41-63

Zhuang Zhou, *Zhuangzi* (4<sup>th</sup> c. BCE), 95-104

\*Joseph Needham, *Science and Civilisation in China II* (1956), 33-83

\*Derk Bodde, “Evidence for ‘Laws of Nature’ in Chinese Thought,” *Harvard Journal of Asiatic Studies* (1957), 709-727

#### **Week 4 (2/16-2/18): Political Cosmology in the Han Dynasty**

Lü Buwei, *Spring and Autumn Annals of Master Lü* (3<sup>rd</sup> c. BCE), 236-241

*Inner Canon of the Yellow Emperor* (2<sup>nd</sup> c. BCE), 319-350

\*Michael Nylan, “Yin-yang, five phases and qi” (2010)

\*Karine Chemla, “Proof, Generality and the Prescription of Mathematical Action: A Nanohistorical Approach to Communication” (2014), 278-300

#### **Week 5 (2/23-2/25): China and Greece in Comparison**

Gongsun Long, “White Horse Dialogue,” (3<sup>rd</sup> c. BCE), 185-189

School of Names, extracts (3<sup>rd</sup> c. BCE), 189-197

\*G.E.R. Lloyd and Nathan Sivin, *The Way and the Word: Science and Medicine in Early China and Greece* (2003), xix-xx, 1-15, 239-252

\*Shigehisa Kuriyama, *The Expressiveness of the Body and the Divergence of Greek and Chinese Medicine* (1999), 1-16, 233-273

## **Unit II: Early Modern Exchange in Late Imperial China**

### **Week 6 (3/2-3/4): Four Great Medieval Inventions**

Shen Kuo, *Dream Pool Essays*, extracts (11<sup>th</sup> c.),

Fengshui compass and maps

\*Francesca Bray, *Technology and Gender: Fabrics of Power in Late Imperial China*, 1-48.

\*Dagmar Schäfer, *The Crafting of the 10,000 Things: Knowledge and Technology in 17th-Century China*, 1-19

### **Week 7 (3/9-3/11): Natural History and the Origins of Globalization**

Li Shizhen and Carla Nappi, *Compendium of Materia Medica* (1596), 53-65

*Classic of Mountains and Seas*, images (16<sup>th</sup> c.)

\*Bian He, *Know Your Remedies: Pharmacy and Early Modern Culture in China* (2020), 1-48

\*Carla Nappi, *The Monkey and the Inkpot: Natural History and Its Transformations in Early Modern China*, 1-11, 69-82

### **Week 8 (3/16-3/18): A Meeting of Worlds in the Ming**

Luo Hongxian, *Enlarged Territorial Atlas* (1561)

Matteo Ricci, *The True Meaning of the Lord of Heaven* 56-63, World Map (1602-1603)

\*Zhang Qiong, *Making the New World Their Own* (2015), 148-202

\*Cordell Yee, "Reinterpreting Traditional Chinese Geographical Maps" (1994), 35-70

### **Week 9 (3/23-3/25): Imperial Science in the Qing**

Kangxi Emperor with Jonathan Spence, *Emperor of China* (18<sup>th</sup> c.), 61-90

Yu Yonghe, *Small Sea Travelogue* (1697), 266-280

\*Emma Teng, *Taiwan's Imagined Geography* (2006), 1-59

\*Catherine Jami, *The Emperor's New Mathematics* (2012), 1-10, 214-236

## **Unit III: Science, Technology, and Society in Modern China**

### **Week 10 (3/30-4/1): Military Reform and Self-Strengthening**

Feng Guifen, "Protests from the Study of Jiaobin" (1861), 235-238

Yan Fu, "On Strength" (1895), 254-260

\*Fa-Ti Fan, *British Naturalists in China: Science, Empire, and Cultural Encounter* (2004), 1-39

\*Marwa Elshakry, "When Science Became Western," *Isis* (2010), 98-109

### **Week 11 (4/6-4/8): Mr. Science and the Chinese Nation**

Hu Shi et. al., Debate on science and the philosophy of life (1910s-1930s), 366-377

Hu Shi et. al., Controversy over Chinese and Western cultures (1910s-1930s), 377-389

\*Thomas Mullaney, *The Chinese Typewriter: A History* (2017), 1-74

\*Ruth Rogaski, *Hygienic Modernity: Meanings of Health and Disease in Treaty-Port China* (2014): 1-21

### **Week 12 (4/13-4/15): Socialist Science in the Peoples' Republic**

Mao Zedong, "Talk on Questions of Philosophy" (1964)

Great Leap Forward (video extracts)

\*Sigrid Schmalzer, *The Peoples' Peking Man* (2008), 1-16, 86-112

\* Judith Shapiro, *Mao's War Against Nature: Politics and the Environment in Revolutionary China* (2001), 1-20

**Week 13 (4/20-4/22): Science in China Today**

Sarah Zhang, "China is Genetically Engineering Monkeys with Brain Disorders," *The Atlantic* (2018)

Shellen Wu, "China: How Science Made a Superpower," *Nature* (2019), 25-28

\*Benjamin Elman, "Toward a History of Modern Science in Republican China," 15-38

\*Wang Zuoye, "Science and the State in Modern China," *Isis* (2007): 558-570

**Conclusion (4/27-4/29): What is Chinese Science?**