



## EMERGENCE OF MODERN SCIENCE

From the ongoing climate crisis to public health in the Covid-19 pandemic, from personal and collective questions about heredity and belonging to metaphysical questions about life and death, we turn to science for authoritative answers on many contemporary issues. But how did science come to have such a central and transformative force in our everyday life? Which actors, institutions and practices have shaped the history of science? It might seem obvious at first, but how exactly do we define science? Does science exist in the “singular” or should we speak of “sciences” or, better still, of “knowledges”?

This course gives you the conceptual and empirical tools to query such questions. We will survey the emergence of scientific world views from the antiquity to the present. Moving chronologically and thematically, we will situate the history of science as a history of different “ways of knowing”. Each week we will place ourselves in a specific historical setting and learn to ask socially informed questions about the practice of science in that period. How do historical, social, cultural, religious, aesthetic and political forces shape the questions that scientists ask? What is the relationship between scientific research and the making of gender/sex/race differences? What counts as science and what is left out? And can postcolonial, feminist, and indigenous studies better inform how science is done today? Focusing on these questions this course will introduce concepts and case studies that help us historicize and also reimagine our relationship with scientific knowledge and expertise. Reading across different time periods and geographies, students will cultivate skills in critical thinking as we analyze, refigure, and speculate scientific present, pasts, and futures.

## COURSE ASSIGNMENTS & GRADING WEIGHTAGE

The assessment for this course is split into two components. Half of your grade is based on participation in the course assessed through weekly annotations on readings in Perusal (via Canvas) and journal reflections. The second half is a course-long project. See below for details.

### Participation (50%)

Weekly Annotations	20%
Weekly Reflections	30%

### Implosion Project (50%)

Implosion Project Submission I (due July 21)	20%
Implosion Project Submission Final (due August 8)	30%

**\*\*All submissions are Due midnight of your time zone\*\***

### **Weekly Annotations**

Before we meet for each synchronous session, you will annotate course material on canvas with brief comments/questions. You are also encouraged to respond to your classmate's comments and questions. Think of this as a chat space between you and rest of the class. These are graded as complete / incomplete on a scale of 0 to 1. You need to complete a total of 10 annotations to reach full credit.

### **Weekly Reflections**

At the end of each week (Friday / Saturday) you will submit a 1–2-page reflection on the themes of the week. This should not be a summary. You should use this space to reflect on points/arguments that stood out to you and problems that you found compelling. Your reflection does not need to have elaborate citations or be structured like an essay. However, you must refer to course material, lectures, and our in-class activities/discussions. Some weeks I might give you prompts/questions in advance.

### **Final Assignment: Implosion Project**

The second half of your grade is a course long project that asks you to analyze the history of a scientific, technological, or medical thing/fact/artifact. **More instructions will be given in the first session**, and we will do weekly check-ins to make sure you are building towards your final submissions. Since the course is only five weeks long, it is important that you work on the implosion assignment throughout the course.

Steps towards your “implosion project”:

a) Choose a thing, a fact, an artifact, a process that makes a claim/is related to science & nature, gender, sex, race, body or is thematically relevant to our class in some way. Be as specific as possible. For example, if I were to choose a birth control pill, I would select a *particular* one from a specific brand like Apri sold/available to me at a particular place. If you choose a “fact” or a statistic or a story or a book, be *specific* about where it appears.

To search for your “thing” you could: think about a specific area of scientific research (like primatology, evolutionary and biological sciences, psychology, genomics, epigenetics, intelligence testing, biometric testing, reproductive health, physics etc.), search scientific publications like Nature or Scientific American, or browse recent newspaper. You could also notice/attend to your own surroundings a pick an idea/a technology/a material you use/come across in your daily life.

**\*\*Submit your implosion project idea via canvas by July 14\*\***

b) Once you have your thing/artifact/fact/process write down all the common knowledge that you have (without additional research or google searches) about the “thing”. To do this, to “implode”

this object, you have to answer as many questions as you can on *Dumit, Writing the Implosion*, p. 351 – 354 (see on canvas). Make a bullet list of your answers with a note on gaps in your own knowledge.

c) You have now gathered your current knowledge about this “thing”. Next, you will begin to use resources, simple google searches, professional journals, newspaper articles etc to gather answers to the same questions. Keep a track of *who* and from *where* you are finding these answers. These become the domains of expertise on your “thing”.

**\*\*Your notes on step b & c due on July 21\*\***

d) What kinds of knowledge make up your expertise? Are their forms of knowledge on your “thing” that are marginalized or missing from your list? Are there people/communities who are better placed to answer the same questions?

e) Using a cluster of questions that you have answered, and the knowledge you have gathered, you will submit a final project. This can be a 2000-word essay mobilizing our class readings towards analyzing your “thing” or a multimedia project that uses your gathered material as sources to make an argument related to our class (formats can be podcast, a video, a material exhibit, a craft project and so forth). Your final should draw upon at least 3 readings and 3 lectures from the course.

**\*\* Final submission due on August 8\*\***

## GRADING STANDARDS

A = outstanding, nearly flawless work; assignment(s) completed thoroughly; technically excellent; evidence of creativity and/or inspiration, deep contextual grasp of issues and connections among issues; and ability to synthesize individual elements into broader analysis. [A: 93% and above; A-: 90-92.9%]

B = good work; all aspects of assignment(s) completed thoroughly and competently; technically competent (though perhaps not perfect) in spelling, grammar, format, citations; presentation adequate; does not consistently show inspiration, creativity, deeper grasp of connections, interpretations, and/or synthesis among elements. [B+: 87-89.9; B: 84-86.9; B-: 80-83.9]

C = less than fully satisfactory work; assignment(s) not completed thoroughly or according to instructions; basic grasp of issues not always evident; more than occasional technical flaws. [C+: 77-79.9; C: 74-76.9; C-: 70-73.9]

D = basic work of course (or assignment) not done; little effort evident. [D+: 67-69.9; D: 64-66.9; D-: 60-63.9]

F = incomplete or unsatisfactory work on major assignments or over the course of the semester [<60]

## ACADEMIC INTEGRITY

Please refer to the Penn [Code of Academic Integrity](#). We will take any evidence of cheating, plagiarism, or other forms of academic dishonesty very seriously; possible consequences include failure of the course and disciplinary action.

We will strive to ensure that the course is a space of mutual respect, free of any form of bullying, abuse, harassment, or discrimination based on race, class, religion, age, language, national origin, or sexual identity or orientation, or other personal characteristics. If you believe that these expectations are being violated, please inform one of the instructional staff or the appropriate advising and reporting offices at Penn.

## SYLLABUS CHANGE POLICY

The syllabus and our schedule is tentative and is subject to change with advanced notice. Please see below for a full list of readings and sources.

# SCHEDULE AND READINGS

## Week 1 : Beginnings

1. Orientations | Friday, July 1

keywords: modernity, science

- Syllabus

## Week 2: Astronomy and Historiography of Science

2. Historicizing | Monday, July 4

keywords: scientist, epistemology, historiography

- Chanda Prescod-Weinstein, *The Disordered Cosmos: A Journey into Dark Matter, Spacetime & Dreams Deferred* (2021), Chapters: Who is a Scientist? What is the point of science
- Lorraine Daston, *History of Science*, 2015

3. Historicizing II | Wednesday, July 6

keywords: enlightenment, historiography

4. Calculating | Friday, July 8

keywords: expertise, astronomy/astrology

- David Brown, “The Scientific Revolution of 700 BC”
- Stop Calling the Babylonians Scientists <https://www.theatlantic.com/science/archive/2016/02/babylonians-scientists/462150/>

Weekly Reflection Due

Implosion Project Idea Due

## Week 3: Colonial Encounters

5. Collecting | Monday, July 11

keywords: indigenous knowledge, go-betweens

- Susan Scott, Parrish (2007), “Diasporic African Sources of Enlightenment Knowledge”

6. Observing | Wednesday, July 13

keywords: : visual epistemology, observation and experiment, empires

- Daniela Bleichmar, *Visible Empire*, Selections

## 7. Mapping | Friday, July 15

keywords: cartography, immutable mobiles

- Neil Safier, “An Enlightened Amazon, with Fables and a Fold-Out Map”

## Week 4: Experiments: Assistants and Artisans

## 8. Crafting | Monday, July 18

keywords: artisanal epistemology

- Pamela Smith, TBD

## 9. Crafting II | Wednesday, July 20

keywords: tacit knowledge

- Eyferth, “Craft Knowledge at the interface of Written and Oral Cultures”
- Harry Collins, “Tacit and Explicit Knowledge”

## 10. Experimenting | Friday, July 22

keywords: social relations, habitus

- Steve Shapin, *The House of Experiment*

## Week 5 : Laboring Knowledges in Late Colonial Worlds

## 11. Gathering | Monday, July 25

- Listen to Gabriela Soto Laveaga talk on her book *Jungle Laboratories*  
Episode nine on <https://www.bbqplus.org/ventricles-podcast>
- Robyn D’Avignon “Primitive Techniques: From ‘Customary’ to ‘Artisanal’ Mining in French West Africa” (2018)

## 12. Gathering II | Wednesday, July 27

## 13. TBD | Friday, July 29

## Week 6: Science and Relations

## 14. Gendering | Monday, August 1

keywords: gender, feminist STS

- Sarah S. Richardson, “Seeing the X: How the X Became the “Female Chromosome.””

## 15. Belonging | Wednesday August 3

keywords: bio-citizenship, genetics

- Banu Subramaniam, “Biocitizenship in Neoliberal Times: On the Making of the “In-

dian” Genome.”

16.Wrap Up | Friday, August 5

- In-class show and tell of Implosion Projects
- Watch : Pumzi