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# HIST-128: HISTORY OF SCIENCE

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**Also listed as:** BIOL-128 / BIOL-128H / HIST-128H

**Effective Term**

Fall 2026

**BOT Approval Date**

06/12/2025

**Discipline**

HIST - History

**Course Number**

128

**Course Title**

History of Science

**Short Title**

History of Science

**Credit Status (CB 04)**

D - Credit - Degree applicable

**Units**

**Lecture Units**

3.00

**Total Units**

3.00

**Hours**

**Lecture Contact Hours**

48-54

**Out of Class Hours Lecture**

96-108

**Total Contact Hours**

48 - 54

**Total Out of Class Hours**

96 - 108

**Total Student Learning Hours**

144 - 162

**Distance Education**

Yes

**Distance Education**

**Distance Education Type**

Both Fully Online and Hybrid Online

**Does the DE also apply to the Honors section?**

Yes



Honors component will meet synchronously (face-to-face or moderated through online technology such as Zoom)

**Fully Online Delivery Requirements:**

- a. Students must be notified via the college schedule of classes and the syllabus for the class if proctored tests are required for this course
- b. Any planned face-to-face meetings, such as an orientation or study session, must be optional
- c. The MSJC curriculum committee requires the use of accessible, asynchronous discussion as a component of every fully online course

**Are you using publisher content?**

No

**Regular Substantive Interaction**

Instructor-to-student, student-to-student, and student-to-content contact shall be distributed in a manner that will ensure regular substantive interaction (RSI) is maintained not only weekly but also for the duration of the course. Instructor interactions should be equivalent in time, quality and consistency to the engagement students would receive in a face-to-face course—for example, through announcements, discussion participation, personalized feedback, video messages, or other instructional communications. Instructors are expected to be responsive to student inquiries within a 24-72 hour time frame excluding holidays. RSI will be maintained through a variety of methods:

- Orientation - Students must be oriented to the online and face-to-face portions at the start of the course.
- Announcements - Announcements using the course management system must be posted at least weekly to keep students current on course events, due dates, materials, etc.
- Discussion Forums - Content-related discussion forums within the designated CMS will include appropriate instructor participation and will be initiated and maintained, with timely feedback provided. Instructors are required to monitor the discussions and related activities to provide guidance and direction. Open-ended discussion boards may be used to further learning and interaction.
- MSJC Communication – Instructor will use MSJC-administered communication tools (such as email or the designated CMS communication tools) to regularly communicate with and provide ease of access to students.
- Timely Feedback - Timely feedback on student work will be provided by the instructor, which may include comments and/or rubrics, within the Grades area of the designated CMS.
- Scheduled Meetings – Hybrid and synchronous courses will meet at regularly scheduled times. ADA Compliance - All course interactions and content must be designed with accessibility in mind and meet ADA requirements.

**Cross Listed Course(s)**

BIOL-128

**C-ID (Admin Only)**

CB 00

CCC000561993

**Course Title**

History of Science

**Honors / Non-honors**

BIOL-128H

**C-ID (Admin Only)**

CB 00

CCC000564644

**Course Title**

Honors History of Science

**Approved Cal-GETC Area**

AREA-4

**Approved Second Cal-GETC Area**

**Approved Third Cal-GETC Area**

**C-ID (Admin Only)**

**CB 00**

CCC000561776

**Course Title**

Honors History of Science

**Approved Cal-GETC Area**

AREA-4

**Approved Second Cal-GETC Area****Approved Third Cal-GETC Area****Catalog Description**

This course surveys the history of science from its early beginnings to its development in various civilizations, eras and regions. Students explore the impact of science on humanity in the context of the economic, social, and political realities of different cultures. Underlying assumptions, methods and key ideas in science are surveyed from ancient insights through the Scientific Revolution in Europe to recent science and technology innovations.

**Requisites****Recommended Preparation****Recommended Preparation (note that students can enroll in the class even if they haven't take the recommended course)**

ENGL-C1000 or concurrent enrollment in ENGL-C1000.

**Codes****TOP Code (CB 03)**

2205.00 - History

**CIP Code**

54.0104 - History and Philosophy of Science and Technology.

**Repeatability Code**

No

**Grading Option**

Letter grade OR P/NP

**Minimum Qualifications**

| Minimum Qualifications                 | And/Or |
|----------------------------------------|--------|
| Anthropology (Masters Required)        | Or     |
| Biological Sciences (Masters Required) | Or     |
| Chemistry (Masters Required)           | Or     |
| History (Masters Required)             | Or     |
| Mathematics (Masters Required)         | Or     |
| Physical Sciences (Masters Required)   | Or     |
| Physics/Astronomy (Masters Required)   | End    |

**GE Information****Check GE Types Requested**

AA/AS B2 - Social &amp; Behavioral Sciences

## Cal-GETC Areas

### Approved Cal-GETC Area

AREA-4

## Learning Objectives

### Learning Objectives

| Learning Objective                                                                                                                                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Develop a definition of science.                                                                                                                                                         |
| 2. Compare major scientific innovations and the evolving relationship between science and technology in different time periods and regions in the history of science.                       |
| 3. Compare the many origins of science in diverse cultures, areas, and eras.                                                                                                                |
| 4. Assess what roles practitioners of science have played in different eras and cultures, including recognizing the perspectives and contributions of historically underrepresented groups. |
| 5. Analyze who provided support or patronage for scientific and technological innovation.                                                                                                   |
| 6. Consider how scientific knowledge was shared through global trade networks, institutions of learning, scientific societies, and scientific journals.                                     |
| 7. Contrast scientific knowledge generation with other ways of conceiving reliable knowledge.                                                                                               |
| 8. Examine primary and secondary sources focusing on concepts such as historical agency, context, perspective, and multi-causation.                                                         |
| 9. Analyze the role of race, class, gender and ethnicity in the history of science.                                                                                                         |
| 10. Reflect on the meaning and significance of science to our society and to the learners themselves.                                                                                       |

### Honors Objectives

1. Encourage advanced research, writing, and presentation techniques using both primary and secondary sources.

2. Complete a research project involving original research or an original thesis and use of primary and secondary sources that in some cases will be a multi-disciplinary examination of the topic.

3. Engage in small group discussions over challenging primary and secondary source readings, research, and writing topics.

4. Address major issues and important interpretations in the history of science with the instructor and other honors students.

## Learning Outcome Information

### Course Learning Outcomes

| Learning Outcome                                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------|
| 1. Students will be able to describe how different societies define and practice science.                                |
| 2. Students will be able to identify key innovations in the history of science and their impact on society and culture.  |
| 3. Students will be able to analyze the philosophical and ethical ramifications of the uses of science.                  |
| 4. Students will be able to identify, develop, and defend a thesis as it relates to the evolution of scientific thought. |
| 5. Students will analyze and assess a variety of sources as they relate to the history of science.                       |

## Content

### Course Lecture Content

1. Introduction to Course

a. Definitions of science, technology, engineering, and math.

i. History of science as a discipline

ii. Relationship of science to technology

iii. Characteristics of scientific inquiry

2. Origins of Humanity and Science

a. Paleolithic and the origin of humanity

i. Tools

ii. Roles of males and females in Paleolithic communities

b. Neolithic Revolution

- i. Origin of agriculture
    - ii. Human settlement patterns
    - iii. Roles of males and females in Neolithic communities
  - c. Science in the ancient world
  - d. Rise of the first civilizations
    - i. Urban Revolution
    - ii. Mesopotamia
      - 1. Multiculturalism
      - 2. Writing as a technology
      - 3. Importance of record-keeping in the spread of science between cultures
    - iii. Egypt
    - iv. Indus Valley Civilization
  - e. Science in the earliest civilizations
    - i. Mathematics
    - ii. Celestial divination and astronomy
    - iii. Domestication and agriculture
    - iv. Disease, treatment, and healing
    - v. Contribution of women and underrepresented groups
- 3. Hellenic and Hellenistic Science
  - a. Greek Natural philosophy
    - i. Astronomy and cosmology
    - ii. Physics
  - iii. Aristotle
  - iv. Eastward Diffusion of Greek Science
  - v. Inclusion in science and society
  - b. Alexandria
    - i. The value of intercultural exchange and dialogue at the library
- 4. Rome, Byzantium, and Islam
  - a. Technological innovations
  - b. Engineering feats
  - c. Medicine and hospitals
    - i. Hellenistic anatomy, physiology, and medical sects
    - ii. Galen and the culmination of Hellenistic medicine
    - iii. Contributions of female practitioners
  - d. Roman and early Medieval education
  - e. Islamic Empire
    - i. Reception and Appropriation of Greek Science
    - ii. Translation of Greek, Persian, and other texts into Arabic
    - iii. Achievements in Science, Mathematics, Agriculture, and Medicine in the Islamic World
    - iv. Diversity and inclusion in the Islamic Empire
- 5. Diverse Origins of Science Around the World
  - a. China
    - i. Chinese philosophies and worldviews
    - ii. Early beginnings and the rise of civilization
      - 1. Mohism, Daoism, Confucianism
      - 2. Yin and Yang
      - 3. Disease and treatment legacies
      - 4. Gender roles and social stratification
  - b. India
    - i. Mathematics
      - 1. Place-value system
      - 2. Use of the zero
      - 3. Mathematical notations and Indian cosmology
      - 4. Spread of Indian mathematics to the Middle East, Asia, and Europe
    - ii. Medicine in ancient India

1. Ayurvedic
2. Sushruta
- iii. Indian Mathematics
  1. Spread of Indian mathematics to the Middle East, Asia, and Europe
- iv. Historical Context of the Mauryan and Gupta Empires
- v. Gender roles and social stratification
- c. Americas
  - i. Caral-Supe civilization
  - ii. Maya civilization
    1. Cosmology and astronomy
    2. Math
    3. Calendars
    4. Monumental architecture
    5. Cultural interactions with imperial Europe
  - iii. Aztec civilization
    1. Education and the influence of class and gender
    2. Agriculture
    3. Cultural interactions with imperial Europe
  - iv. Inca civilization
    1. Technology and engineering
    2. Quipu and counting systems
    3. Agriculture
    4. Cultural interactions with imperial Europe
6. Medieval Europe
  - a. Revival of learning in the West
    - i. Schools of the eleventh and twelfth centuries
    - ii. The rise of universities
  - iii. Aristotle in the university
  - iv. Curriculum
  - b. Carolingian reforms
  - c. Mathematical astronomy
  - d. Medical practices
7. The Scientific Revolution in Western Europe
  - a. Background to the Scientific Revolution from Aristotle and Ptolemy to Copernicus
  - b. The importance of international and intercultural exchanges in the construction of modern science
  - c. Cosmological models
  - d. Physics
  - e. Mathematical development
  - f. The mechanical universe
  - g. Women and the Scientific Revolution: Maria Winkelmann, Maria Sibylla Merian, Margaret Cavendish
  - h. Medicine and anatomy: Paracelsus, Harvey, Vesalius
    - i. Francis Bacon and inductive reasoning
8. The Industrial Revolution and the Enlightenment in Western Europe
  - a. Popularization of science
  - b. Development of the Newtonian mechanical worldview
  - c. Development of science during the Enlightenment
    - i. Female patrons during the Enlightenment
    - ii. Inclusion/exclusion of non-Western cultures
  - d. Imperial expansionism
  - e. Industrialization and new technologies
  - f. Medical advances and technologies
  - g. Methods of imperial rule
  - h. Scientific justifications for imperialism and colonialism
    - i. Racial hierarchies and racism
  - i. Discovery science: from Columbus, Wallace, Livingstone to the Present
  - j. The Geological Revolution

- i. Kelvin and other early attempts to age the Earth
  - ii. Cuvier and Catastrophism vs. Uniformitarianism
  - iii. Lyell and deep time
- k. The Fossil record
- l. The Darwinian Revolution and evolution
  - i. Early theories of evolution
  - ii. Lamarck
  - iii. *Vestiges of Natural History of Creation*
  - iv. Initial responses to Darwin
  - v. Evolutionary theory as a big idea in science and society
  - vi. The eclipse of Darwin
  - vii. Uses and abuses of evolutionary theory
    - 1. Eugenics and ableism
    - 2. Human experimentation
    - 3. Informed consent
- m. Mendel and the concept of the gene
- 9. The Modern Era and the Future
  - a. Mendel vs. Darwin and Genetics vs. Phylogenetics
  - b. The Modern Synthesis
  - c. Big science
    - i. Big physics
    - ii. The Human Genome Project
  - d. Biotechnology from traditional selection to the Flavr Savr tomato and beyond
  - e. Medical revolution
    - i. Cell Theory
    - ii. Pre-Germ theory conception of disease
    - iii. Development and Repercussions of Germ Theory
    - iv. Development of Variolation and Vaccination Science
    - v. Development of scientific conceptions of race and gender
  - f. Industrialization and Technologies of Warfare
    - i. Science and the Cold War
    - ii. The bomb
  - g. Integration of science and society
  - h. The place of science in a modern technological society
    - i. Post-modernist critiques of science
    - j. Politics of inclusion and exclusion for female scientists
  - k. Political abuses, education, and public perceptions
    - l. Science ethics and oversight
  - m. Promise and Prospects for the Future

### Honors Content

The honors component of Biology/History 128 will encourage students to work above the survey level to explore the concepts of the history of science with greater depth and complexity. Students will engage in research that will involve working with both primary and secondary sources, studying major historiographical controversies and interpretive schools, and engaging in discussions with the instructor and other honors students about the disciplines of history and science. The topics to be covered in Biology/History 128H are the same as those covered in Biology/History 128. In addition, honors students will analyze current research and historical concerns pertaining to the history of science on topics such as the Pythagorean School, atomism, scientific and technological advancements of China's Tang Dynasty, women and the Scientific Revolution, taxonomic and encyclopedic efforts of eighteenth-century Europe, Scientific Naturalism and the Prayer-Gauge Debate, science and war, and the evolution of industrial scientific research in the United States.

### Methods of Instruction

#### Method

Discussion

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**Integration**

Guided small group discussions will enable students to analyze and interpret the primary and secondary source readings or films to gain a deeper understanding of scientific innovations in different eras and cultures and the evolving relationship between science and technology. Topics might include discussions of selected aphorisms from Francis Bacon's New Organon, how sexual orientation can impact science using The Imitation Game as a source, and scholarly analysis of why a scientific revolution did not occur in China as early as in Europe.

**DE Adaptations for MOI**

The instructor will use the CMS to create threaded discussions on subjects that require students to analyze, interpret, and discuss primary source documents and questions and controversies surrounding major developments in the history of science. Each student will be required to post a response to the discussion topic and make subsequent posts that engage the views of other students. Instructor will make comments to further the discussion or make corrections and/or post a summary of the debate that reviews the issues raised by the students and adds the instructor's perspective to the online debate. All online discussions will meet accessibility standards.

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**Method**

Lecture

**Integration**

Lectures will introduce key concepts and interpretive approaches to understanding the what science means in different cultures and eras, how science originated, developed and was used in various cultures and eras, and how modern science was constructed. Lectures will expand upon information provided in the assigned reading and visual materials, and provide the students with framework with which to analyze definitions of science, scientific institutions and practitioners, and the scientific perspectives of underrepresented groups. Supporting visual materials may include PowerPoint presentations and other digitally-generated images such as charts, diagrams, photos, or film clips.

**DE Adaptations for MOI**

Online lectures will introduce key concepts and interpretive approaches to understanding the what science means in different cultures and eras, how science originated, developed and was used in various cultures and eras, and how modern science was constructed. Lectures will expand upon information provided in the assigned reading and visual materials, and provide the students with framework with which to analyze definitions of science, scientific institutions and practitioners, and the scientific perspectives of underrepresented groups. Supporting visual materials may include PowerPoint presentations and other digitally-generated images such as charts, diagrams, photos, or film clips. These may be delivered in the form of slide presentations, real-time video/audio/teleconferencing, video/audio recordings and/or readings utilizing other features within the CMS. Lectures may incorporate supplemental materials available through MSJC Library or other online resources. Hybrid course offerings may include lectures in a face-to-face setting as outlined in Methods of Instruction or through the CMS as outlined in DE Methods of Instruction. All lecture materials and delivery methods must meet accessibility guidelines.

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**Method**

Projects

**Integration**

The instructor(s) will take time in class to describe the methods, sources, and topics for a research project through which students will develop an original thesis and acquire additional knowledge about select topics such as urban planning in the Indus Valley, oracle bone divination in Shang China, the library at Alexandria, the influenza pandemic of 1918, or the Fukushima meltdown. The instructor(s) will explain the requirements for the assignment, the need for analysis and critical thinking, and the importance of research and bibliographical work.

**DE Adaptations for MOI**

The instructor will provide written instructions via the CMS explaining the methods, sources, and goals for a research project through which students will develop an original thesis and acquire additional knowledge about a select topic such as urban planning in the Indus Valley, oracle bone divination in Shang China, the library at Alexandria, the influenza pandemic of 1918, or the Fukushima meltdown. The written instructions will emphasize the need for analysis and critical thinking, and the importance of research and bibliographic work. Students will interpret the material researched in the form of an extended essay or multimedia presentation. The instructor will make an adjustment for accessibility needs.

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**Method**

Reading

**Integration**

Instruction will be provided in how to analyze and interpret the chapters in the course text and the primary and secondary source materials to assist the students in gaining a deeper understanding of government patronage of science, diffusion of technology along trade routes, the impact of translation initiatives, monumental building practices, industrialization, evolutionary theories, the genome project, and related topics.

**DE Adaptations for MOI**

Online reading which cover major developments in topics such as government patronage of science, diffusion of technology along trade routes, the impact of translation initiatives, monumental building practices, industrialization, evolutionary theories, the genome project, and related topics.

Written instructions will be provided in how to analyze and interpret the chapters in the course text and the primary and secondary source materials. Reading materials will be accessible through the CMS, the MSJC Library, or other online resources. All reading materials and delivery methods must meet accessibility guidelines.

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**Additional Methods of Instruction for Honors**

Method: Honors Section Meetings

Integration: Honors section meetings will provide a forum for instructors and students to discuss the field of the history of science and historiography as well as analyze and interpret assigned readings or films to gain a deeper understanding of key concepts, people, events, and scientific and technological innovations that have shaped modern world history. These discussions can also cover student progress on research projects including research proposals, sources, thesis statements, outlines, and rough drafts as well as peer-reviews of these assignments. Students will meet as a group or individually with the instructor a minimum of once a month for a minimum of four meetings over the course of the semester.

Method: Service Learning Project

Integration: Service learning at history or science institutions, museums, or similar locations will help students gain hands-on experience in areas that pertain to the field of the history of science. This will be useful to students making decisions about major and career choices and will encourage them to seek out additional volunteer or internship opportunities after the conclusion of the course.

Method: Oral Presentations

Integration: Oral presentations will provide honors students the opportunity of presenting their research projects to their honors colleagues or the regular class to facilitate the development of their presentation and communication skills.

Method: Out of Class Activities

Integration: Students will engage with academic inquiry and analysis of history of science topics by visiting a museum exhibition, going to a film screening, or attending an academic lecture at a nearby university or museum. These activities will encourage students to draw parallels between the past and contemporary society and provide a means of experiencing history of science through a variety of media beyond the classroom.

**Methods of Evaluation****Method**

Exams/Tests

**Integration**

Reading quizzes and final exams will consist of multiple choice, fill-in-the-blank, or similar questions and will require students to demonstrate competence with factual and thematic information covered in the textbook and lectures. The quizzes will cover each topic of the course and will encourage students to demonstrate comprehension of basic content such as defining science, the role of science practitioners in different contexts, the global origin of science and similar topics. The final will be similar to the quizzes but cumulative. Exams/tests will be evaluated based on the demonstration of understanding and application of major topics as described in Course Content in alignment with Learning Objectives.

**DE Adaptations for MOE**

Exams and/or tests administered fully online will be administered and evaluated through CMS. Hybrid course offerings may include exams/tests in a face-to-face setting as outlined in Methods of Instruction or through the CMS as outlined in DE Methods of Instruction. The format may include multiple choice, short answer, essay or other format. Exams/tests will be evaluated based on the demonstration of understanding and application of major topics as described in Course Content in alignment with Learning Objectives, such as defining science, the role of science practitioners in different contexts, the global origin of science and similar

topics. . Instructor feedback may be presented through grade book comments, inbox or other confidential means of communication through the course management system. Feedback will be provided in a timely fashion, typically within a two-week period. All exams/ tests must meet accessibility guidelines.

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**Method**

Papers

**Integration**

Short or extended essay assignments that require students to use primary and secondary source readings to investigate key themes in the course, such as diverse contexts, practices, and definitions of science, global examples of science, the Scientific and Industrial Revolutions in Europe, and science in the contemporary world. They will be graded on the quality of the thesis, incorporation of academic sources, organization, and coherency of the writing.

**DE Adaptations for MOE**

Instructor will use the CMS to post detailed instructions for short or extended essay assignments that require students to use primary and secondary source readings to investigate key themes in the course, such as diverse contexts, practices, and definitions of science, global examples of science, the Scientific and Industrial Revolutions in Europe, and science in the contemporary world. They will be graded on the quality of the thesis, incorporation of academic sources, organization, and coherency of the writing. These assignments will be submitted via the CMS and graded on content, analysis, and the use of sources. Instructor feedback may be presented through grade book comments, inbox or other confidential means of communication through the course management system typically within a two-week period. All papers must meet accessibility guidelines.

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**Method**

Research Projects

**Integration**

A research project will be completed outside of class and requires the use of outside sources to investigate an idea, person, or event in the history of science to produce an organized response. The instructor(s) will explain how to find and use a variety of library materials (journal articles, books, primary and secondary source documents, etc.) and visual media from Internet sources, for students to acquire additional knowledge about their chosen topic. Students will choose their own topics, which increases the inclusiveness and equity of the course. Allowing students to pursue topics of particular relevance to themselves builds critical thinking and engagement and allows students of different identities to see and investigate their own identity in the history of science. Choice also allows the project to be maximally useful and relevant and provides alternatives for topics that are particularly triggering or traumatizing to certain students. Topics could include the printing press, the bomb, Cai Lun, or the publication of Vestiges of the Natural History of Creation, or comparable topics. The work product will consist of a paper or an alternative format (presentation, multimedia creation) to be determined in collaboration with the instructor(s). Papers will be graded on the evidence used to support the thesis and the quality of analysis. Proper grammar, punctuation, paragraph structure, organization, and source citations will also be evaluated. Alternative work products will be graded on organization, historical and scientific accuracy, quality of the evidence used to support the thesis, quality of the analysis, clarity of communication, and quality of sources consulted.

**DE Adaptations for MOE**

A research project or assigned interpretive paper will be completed outside of class which requires the use of outside sources to work on an idea, person, or event in the history of science to produce an organized response. The instructor will use the CMS to post materials explaining how to find and use a variety of library materials (journal articles, books, primary and secondary source documents, etc.) and visual media from Internet sources, for students to acquire additional knowledge about a select topic in the history of science. Topics could include the printing press, the bomb, Cai Lun, the publication of Vestiges of the Natural History of Creation, or comparable topics. Papers will be graded on the evidence used to support the thesis and the quality of analysis. Proper grammar, punctuation, paragraph structure, organization, and source citations will also be evaluated. Alternative work products will be graded on organization, historical and scientific accuracy, quality of the evidence used to support the thesis, quality of the analysis, clarity of communication, and quality of sources consulted.

The students will interpret the information gained from their research in an analytical essay or multimedia presentation that will be submitted via the CMS and will be graded on the quality of the sources, the validity of the content of their research, as well as their interpretation and analysis of it. Instructor feedback will be provided typically within a two-week period through the CMS, including, but not limited to, gradebook comments, discussion forum, live stream meeting, chat feature or inbox messaging. Hybrid course offerings may include evaluation and interpretation of research in face-to-face environments utilizing methods and feedback outlined in Methods of Evaluation and/or through the course management system as described in DE Methods of Evaluation. All materials, delivery, and instructor/student communication must meet accessibility and confidentiality guidelines.

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**Method**

Class Participation

**Integration**

Discussions and short activities during class time will provide opportunities for students to describe, analyze, and reflect on what science is to various, diverse peoples, compare major scientific innovations and the evolving relationship between science and technology, contrast science and other ways of knowing, and examine primary and secondary sources. These activities will result in a written or oral work product that will constitute participation credit. Participation will be evaluated on accurate, informed and appropriate contributions to the activity.

**DE Adaptations for MOE**

The instructor(s) will provide instructions on how to complete participation activities. Discussions will be implemented on the Discussion feature of the CMS and short activities will be conducted using other CMS features such as peer reviews, announcements, and surveys. These will provide opportunities for students to describe, analyze, and reflect on what science is to various, diverse peoples, compare major scientific innovations and the evolving relationship between science and technology, contrast science and other ways of knowing, and examine primary and secondary sources. Participation will be evaluated by accurate, informed and appropriate contributions to the activity.

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**Evaluation of Honors assignments**

Honors students must successfully complete the regular course and honors assignments to receive honors credit.

Research papers and multimedia projects will be assessed on clarity of argument and presentation, supporting evidence, the number and types of references consulted, depth of analysis, and historical and scientific accuracy.

Oral presentations will be evaluated based on lucidity, organization, critical thinking, originality of argument, and visual aids.

Honors class discussions of supplemental readings or viewings will be judged based on student preparedness as well as the ability of students to summarize, critically analyze, and provide their own perspective on the assigned material.

For service learning projects, students will be evaluated on their completion of the agreed upon number of volunteer hours as well as the quality of the reflection paper that integrates academic source material and their service learning experience, the number and types of references consulted, depth of analysis, organizational structure, grammar, and the connection back to themes associated with the course.

Out of class assignments, text and film discussions will be assessed based on quality, organization, accuracy, and how well they address and further illuminate the subject matter of the course.

**Assignments****Assignment Type**

Reading

**In-class and/or outside of class**

In-class

**Formative or Summative**

Formative

**Assignment**

For this assignment, the goal is to assess the reliability and credibility of online sources and how appropriate particular sources are for academic and scholarly use. You will form small groups in class and search for a topic on the Wikipedia History of Science Portal. You will be encouraged to choose an issue that is both controversial and has a substantial history (e.g., issues related to vaccination, the theory of evolution, eugenics, the printing press, the telescope, or the development of the bomb). In collaboration with your instructor(s), your team will pick a number (equivalent to the number of students on the team) of sections of the article. Each student will focus on the section they chose. Each student will do research so as to be able to critique their section in terms of accuracy, thoroughness, source quality and appropriate emphasis, using a template the instructor(s) will provide. Each student on the team will then integrate at least two new sources in the text.

Finally, the teams will meet to summarize their investigation and to assess the overall quality of the article. Teams will report to the class in a brief (5-minute) presentation describing their conclusions. After all groups have presented, we will have a full-class reflection on the value of the assignment, lessons learned, and take-aways.

**How assignment will be adapted in online format**

Meetings with the instructor and group meetings will take place on a video conferencing platform. break-out rooms or separate video conference sessions

The article assignment will be distributed on the CMS. Sources, conclusions, and reflections will be submitted by students on the CMS. Feedback will be provided in a timely fashion typically within a two-week period. The reading assignment will meet accessibility guidelines.

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**Assignment Type**

Writing

**In-class and/or outside of class**

Outside of class

**Formative or Summative**

Formative

**Assignment**

The goal of this activity is to examine the impact of cultural contact, technology, environmental change, and accelerated tourism on the island of Rapa Nui through a study of a video news report, a documentary short, and an academic peer-reviewed article on this topic.

Watch the two short videos provided in the assignment, read the article, and be able to summarize key points from these works. Provide an original and thoughtful response to the prompt. This should consist of a minimum of three paragraphs for the response. Provide citations for any works consulted using APA, or Chicago citation style. Use correct English grammar, spelling, and diction. Use academic tone. Upload your work as a PDF or Word document to Canvas. Read the comments from your instructors. Then, if appropriate, revise and resubmit your work within one week of receiving it back. Provide a response to this prompt:

According to the videos and article provided, what main challenges are the people and/or island of Rapa Nui facing? Discuss three specific examples of these challenges from the assignment videos or article and how the challenges have been/could be addressed. The discussion of each challenge should be a minimum of one paragraph in length for a minimum total of three paragraphs. Alternatively, students can submit a 3-4 minute video clip that addresses the same prompt. Specific examples must be provided from the assignment materials.

**How assignment will be adapted in online format**

The assignment videos and article will be provided in the CMS and meet accessibility standards. Responses will be uploaded to or completed in the CMS. Students will receive feedback, typically within a one-week period through the CMS.

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**Assignment Type**

Other

**In-class and/or outside of class**

In-class

**Formative or Summative**

Summative

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**Assignment**

For this assignment you will collaborate with other students to create a presentation to educate your classmates on a topic. Your group will select an artifact, historical site, or people in the History of Science that your group is interested in researching and teaching to our class during Week Nine of the semester. Topics can include content we cover in class, those we only briefly cover, or those we do not address. Consider a well known artifact or site in the History of Science, one that is historically underrepresented, controversial, or one that scholars have recently discovered or reassessed based on new findings. Topics can include bones, mummies, tools, tombs, caves, calendars, maps, observatories, villages, cities, writing systems, transportation networks (e.g. roads and waterways), architectural feats, artworks, defensive fortifications, forms of metallurgy, sites of learning, hospitals, plagues, military technologies, building technologies, books, industrial complexes, sites of nuclear disasters, scientific institutions, human zoos, women practitioners of science, impact of scientific racism on scientists.

Over the course of the semester, small groups will meet during class sessions to produce a proposal, outline and source list, and final group presentation. A portion of the class period will be allocated for group meetings. Groups can opt to continue their meetings after the class session is over or at a different time should they wish to extend their discussions. Students will earn points for participating in each in-class meeting. Students will also earn points for their group proposal, a peer review of the proposals of other groups, a group source list, and final group presentation. Students will have an opportunity to assess their own role within the group as well as the work of their colleagues in the group at the end of the project.

**How assignment will be adapted in online format**

Group meetings will take place through a video conference platform in breakout rooms. The project guidelines and requirements will be distributed on the CMS. Assignments will be submitted by students on the CMS and receive feedback, typically within a two-week period on the CMS. Assignments must meet accessibility standards.

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**Assignment Type**

Writing

**In-class and/or outside of class**

Outside of class

**Formative or Summative**

Formative

**Assignment**

We have studied science and technology in this course as well as the experiences of those who worked in these fields over time. The goal of this activity is to become familiar with the terms *racelighting* and *gaslighting* as well as to consider how they have impacted the experiences of women of color working in the field of science today.

Watch the first eleven minutes of "Racelighting People of Color in Schools, Colleges, and Universities." Then read "'There's Realizing, and then There's Realizing': How Social Support Can Counter Gaslighting of Women of Color Scientists." After reviewing both sources, address the following questions:

1. How is *racelighting* defined in the video?
2. What is the difference between active *racelighting* and passive *racelighting* as described in the video?
3. *Racelighting* is associated with *gaslighting* in the video. What is *gaslighting*?
4. According to the authors of the above article, in what ways do women of color working in the field of science experience *gaslighting*? How does this impact their work environment?
5. What solutions do the authors propose to help address this issue?
6. Have you heard of these terms before? After learning more about them, what reaction do you have to the video and/or article?

**How assignment will be adapted in online format**

The video, article, and assignment requirements will be made available to students in the CMS. Students will submit their responses in the CMS using the Assignment feature and receive instructor feedback, typically within a two-week period. This assignment will meet accessibility standards.

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**Assignment Type**

Writing

**In-class and/or outside of class**

Outside of class

**Formative or Summative**

Summative

**Assignment**

In this assignment, you will consider the role of science in the modern world and how it has changed since antiquity.

Read the background material provided here and the article on Bruno Latour.

Provide original and thoughtful responses to the prompts. These should consist of about 3-4 paragraphs for each prompt.

Include at least one quotation in your responses to each prompt.

Cite the article in-line (in the text of your response) when you integrate a quotation.

Provide citations for any works consulted using APA or Chicago citation style.

Use correct English grammar, spelling, and diction.

Use academic tone.

Upload your work as a PDF or Word document to Canvas.

Read the comments from your instructors. Then, if appropriate, revise and resubmit your work within one week of receiving it back.

Read the article "Bruno Latour, the Post-Truth Philosopher, Mounts a Defense of Science".

Bruno Latour is a prominent French scholar in Science and Technology Studies (STS). STS is an academic discipline devoted to social science analysis of science practice.

Some scholars in STS have questioned the claim science makes to Realism. Perhaps our scientific understanding of nature is constructed by people to represent nature in a useful way, but ought not to be considered a true representation of nature. Perhaps nature has no true representation apart from the way people interpret it through various cultural lenses. We have seen, for example, in this course that some cultures had no concept of nature or little interest in nature beyond practical considerations. Others saw nature as representing patterns reflective of perfection or the mind of a deity. Still other cultures saw nature as a perfectly tuned machine.

Bruno Latour conducted several studies of how scientists generate reliable knowledge as a community of practice. More recently, he has worked to encourage greater trust in science given that some issues currently facing us—foremost among them, global warming—may pose an existential threat to our species and perhaps all life on our planet.

**Questions**

1) The article recounts the following interlude: "I could have been a scientist," Latour said with arch gravity. "I've wasted my life. To produce one fact!" Latour sighed, and pointed a finger in the air, as though to demonstrate its indisputable solidity. There was an ache in his eyes. "Can you imagine the pleasure of producing one fact?" Latour claims that science does not actually discover facts about nature as much as science is an "embodied cultural practice" that produces facts about nature. According to Latour, how would a scientist produce a fact? What happens in the making of science that is eventually "black-boxed", leading to the illusion that science discovers facts?

2) Latour's critique of science was, according to him, intended to expand our understanding of how science works, a program that ultimately should improve science as well as the general public's trust in science. The rise of post-truth and bullshit (a term in philosophy that refers to the construction of narratives without regard for their truth, but rather with a focus only on their potential persuasiveness) has allowed Latour's critique to be coopted by corporations and certain mostly conservative partisan political actors. Kellyanne Conway's use of the term "alternative facts" is a recent example. Those who might benefit from casting doubt on the truth of global warming, endangered species protection, evolution theory, and many other scientific ideas now claim, taking a cue from Postmodernist philosophers like Latour, that facts are debatable, that individual perspectives matter more, and that universal truth does not exist. However, if science is right, some of these issues are of critical importance to our future. How does Latour think science should respond to these post-truth attacks?

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**How assignment will be adapted in online format**

The article and assignment instructions will be provided on CMS in an accessible format. Students will upload their response as a PDF or Word document to the CMS. Feedback will be provided in a timely fashion, typically within a two-week period. All aspects of the assignment will meet accessibility guidelines.

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**Assignment Type**

Reading

**In-class and/or outside of class**

Outside of class

**Formative or Summative**

Summative

**Assignment**

The goal of this assignment is to investigate the way our textbook describes modern science as distinct from the development of science over the course of human history.

Read chapter 18 in the textbook.

Provide original and thoughtful responses to the prompts.

These should consist of 1 to 2 paragraphs for each prompt.

Provide citations for any works consulted using APA or Chicago citation style.

Use correct English grammar, spelling, and diction.

Use academic tone.

Create a response document by copying the prompts into a Word or text document. Number the prompts and your responses as they are numbered here.

Upload your work as a PDF or Word document to Canvas.

Read the comments from your instructors. Then, if appropriate, revise and resubmit your work within one week of receiving it back.

After reading chapter 18 in our class text, consider how the authors frame the practice of science today and its role in society. Write a response to these prompts:

1) Chapter 18 of our text is titled "The New Aristotelians". Explain what the authors mean by this title. Who are the new Aristotelians and why do the authors describe them as Aristotelian?

2) In what ways are modern scientists (like Einstein) Aristotelian and in what ways do they differ from the original Aristotelians or other practitioners of science in antiquity? Specifically, how does the practice of science and its social and political role differ between now and the past?

**How assignment will be adapted in online format**

The assignment will be provided on the CMS. Students will upload to or complete the assignment in the CMS. All aspects of the assignment will adhere to current accessibility standards.

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**Honors Assignments****Assignment**

Students will complete all regular course requirements for Biology/History 128 and be graded according to the standards used for the rest of the class. Beyond that, honors students will complete both Assignments A) and B). Students in consultation with the instructor(s), will select either C) or D). Assignments E), F), and G) below are optional and one or two optional assignments may be required at discretion of the instructor.

**Required or Optional**

Required

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**Assignment**

A) Assigned readings of a reasonable quantity beyond the scope of the regular section of Biology/History 128 such as a monograph or three to five academic journal articles. Additional primary documents, journal articles, or a book will be assigned for reading, summary, and review. Contradictory readings on the same topic may be analyzed to encourage critical thinking on the various perspectives of history. Example readings could include selections from the Cambridge History of Science, Thomas Kuhn's *The Structure of Scientific Revolutions*, Mario Biagioli's *Galileo, Courtier: The Practice of Science in the Age of Absolutism*, Janet Browne's *Charles Darwin: Voyaging*, Richard Drayton's *Nature's Government: Science, Imperial Britain, and the "Improvement" of the World*, S.S. Schweber's *In the Shadow of the Bomb: Bethe, Oppenheimer, and the Moral Responsibility of the Scientist*, Robert Kohler's *Lords of the Fly: Drosophila Genetics and the Experimental Life*, and Steven Epstein's *Impure Science: AIDS, Activism, and the Politics of Knowledge*.

**Required or Optional**

Required

**Honors Core Values**

Engagement

**Justify how the assignment reflects the Engagement Core Value**

The materials chosen for this assignment can be controversial or reflective of the current thinking on challenging issues. Students will grapple with the materials' theses, implications, or conclusions and then meet as a group to discuss the material. Students will also complete a 1-2 page personal reflection on the material. This assignment thus promotes engagement with the material (key issues in the history of science), engagement of students with themselves, with each other, and with the instructor.

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**Assignment**

B) A 10-15 minute oral presentation of the final research project (option C or D) given to their fellow honors students, to the entire Biology/History 128 class, or to another appropriate audience. The presentation will include a visual aid (slides, a poster, or similar).

For service learning projects, students may wish to share the content of their reflection with the institution where they volunteered in the form of a lecture, presentation, or suggested action plan that the instructor and other honors students in the course are invited to attend.

**Required or Optional**

Required

**Honors Core Values**

Leadership

**Justify how the assignment reflects the Leadership Core Value**

Students will be expected to present to a group (either the honors section or the whole class). The students must present in a cogent, comprehensible, and accessible manner. This assignment will give students an experience of leadership as they introduce their topic, present their work, and answer questions from the audience.

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**Assignment**

C) Create a service learning project in consultation with the instructor. Service learning can be differentiated from other volunteer experiences by its focus on the integration of academic learning and providing a service to one's community. Students will volunteer at a local history institution, museum, nature preserve, national park, laboratory, hospital, or similar location for a total of 10 hours over the course of the semester and enrich their volunteer experience by reading three articles related to historical preservation sites, museology, the politics of the visual representation of history, scientific practice, hospital care, or similar topics. Students will submit a 4-7 page reflection paper that connects their volunteer experience to themes addressed in the course and assigned readings along with a log of their hours signed by an employee of the institution where they are volunteering.

**Required or Optional**

Optional

**Honors Core Values**

Engagement



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**Justify how the assignment reflects the Engagement Core Value**

A service learning project will provide an Honors student with the opportunity to work within their community, apply their research knowledge, and connect their academic training with their real-world experience at the service learning institution.

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**Assignment**

D) An original research project investigating the history of science, including the impact of science on society, current scientific and science education practices or public attitudes towards science. The research project will involve an original investigation, using clinical interviews, surveys, observations, literature reviews, experiments, or other methods. Students work will be submitted in a series of stages, including but not limited to a proposal of their research topic, a thesis, an annotated bibliography, and a final research product selected from options D1), D2), D3), or D4) below. For options D1), D2), D3), or D4), students will submit an analysis that will include background information, methods of the research or engagement, a discussion of the project, and a reflection. The project will contain a bibliography with a minimum of ten academic sources that must be referenced in the project. As part of this project, students will be given training in research methods in history of science. Students will also submit a 250-word abstract of their work. The instructor may organize student peer reviews of their research proposals, thesis and outlines, or rough drafts of their projects.

The project will be developed by the student in consultation with the instructor. Background research may be conducted in a university library or the equivalent and should be based on the following: primary sources, secondary sources, major interpretive books, and articles.

Examples of appropriate research project topics include translation and transmission of Greek and Islamic science to Latin Christendom, Medieval Islamic medicine, anatomy theaters, botanical gardens, and natural history collections in Early Modern Europe, scientific illustrations in the eighteenth century, the eugenics movement, attitudes toward science or particular science topics (e.g., genetic engineering) among a particular group of people, how science is taught to children, sourced vs. unsourced (legacy) claims in scientific papers, the value of including historical information in the teaching of science to children or adults, how anti-science groups reconcile their rejection of science with its acceptance by society, corporate involvement in public scientific attitudes, women and underrepresented groups' participation in science, scientific racism in the modern world.

**Required or Optional**

Optional

**Honors Core Values**

Academic Rigor and Research  
Engagement

**Justify how the assignment reflects the Academic Rigor and Research Core Value**

The research project will enhance a student's research and writing skills as they select a topic, develop an argumentative thesis based on source evidence, and produce a final product of their research.

**Justify how the assignment reflects the Engagement Core Value**

Research projects can bring students into a community of people, other students, or scholars and they provide an authentic experience of engaging with them.

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**Assignment**

D1) 9-12 page research paper, adhering to the guidelines listed above

**Required or Optional**

Optional

**Honors Core Values**

Academic Rigor and Research

**Justify how the assignment reflects the Academic Rigor and Research Core Value**

The Honors paper will enhance a student's research and writing skills as they select a topic, develop an argumentative thesis based on source evidence, outline their analysis, and produce a final paper.

**Assignment**

D2) Multimedia project of 5-15 minutes in length that adheres to guidelines listed above.

**Required or Optional**

Optional

**Honors Core Values**

Academic Rigor and Research

**Justify how the assignment reflects the Academic Rigor and Research Core Value**

A multimedia project will require academic rigor comparable to a substantial paper, as well as comparable research skills. In addition, the multimedia project will require facility with digital technology.

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**Assignment**

D3) Academic 3 x 5 poster suitable for presentation at an academic conference, adhering to the guidelines listed above.

**Honors Core Values**

Academic Rigor and Research

**Justify how the assignment reflects the Academic Rigor and Research Core Value**

An academic poster requires academic research at a level of rigor comparable to a substantial standard research paper, with the addition of finding appropriate visual aids, making sensible and accurate figures (graphs, maps) and tables, and organizing information to be visually appealing and accessible.

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**Assignment**

D4) Other, as determined in collaboration with the instructor(s), adhering to the guidelines listed above.

**Honors Core Values**

Positive Transgressive Behavior (as evidenced by creativity, innovation, risk taking, challenging norms and standard narratives)

**Justify how the assignment reflects the Positive Transgressive Behavior Core Value**

Students who have creative, innovative, risky, or norm-challenging ideas for a work product for their main honors project can express their positive transgressiveness through this option.

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**Assignment**

E) An interview with a scientist about the purpose, methodology, and significance of their research and how it relates to topics and themes addressed in Biology/History 128H. Students will collaborate with their instructor to select an appropriate person to interview, develop a set of interview questions, review interview protocols, decide on the best way to preserve and present their findings to the instructor or the class (i.e. a brief write-up of their interview or a short oral presentation), and consider how the individual's research contributes to or challenges current scientific perspectives.

**Required or Optional**

Optional

**Honors Core Values**

Leadership

**Justify how the assignment reflects the Leadership Core Value**

Organizing an interview with a professional in the field will require Honors students to develop leadership skills as they select, organize, implement, report, and reflect on the significance of the interview conducted.

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**Assignment**

F) A journal on reading and writing assignments. Journal writing will assist students in understanding and reflecting on important subjects of the course and will help students organize their own questions and comments that can be used in class discussions

**Required or Optional**

Optional

**Honors Core Values**

Holistic Well-being

Inclusivity

**Justify how the assignment reflects the Holistic Well-Being Core Value**

This assignment encourages metacognition and can help students clarify their thinking, commitment to ideas, and career goals. This can lead to greater satisfaction with the course materials, their own work in the course, and with the ideas explored in the materials. It can also allow students to come to better know themselves, thus promoting holistic well-being.

**Justify how the assignment reflects the Inclusivity Core Value**

Journaling will allow students to bring various ideas into their course work that might not have found any other place in the course to be expressed. Further, journaling allows students to express themselves in a manner they are comfortable with, promoting a feeling of inclusion in the course.

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**Assignment**

G) A project outside regular class time designed by the instructor. For example, instructors will lead a field trip to a science museum and complete a project associated with an exhibition or permanent collection at the museum. The instructor may wish to collaborate with the education department or one of the curators of the museum to design a guided tour that is tailored to the specific curriculum of Biology/History 128H. Students will complete a one to two-page analysis of the exhibition and consider how the artwork on display represents and/or challenges themes addressed in the course. Science museums such as the California Science Center and the Natural History Museum of Los Angeles as well as art museums that showcase exhibitions on science such as "African Cosmos" at the Los Angeles County Museum of Art or "Beautiful Science: Ideas That Changed the World" at the Huntington Library are all examples of locations in Southern California that might be considered for this assignment. Other activities could include a film viewing such as *The Imitation Game*, *The Martian*, *Interstellar*, *Contact*, *Inherit the Wind*, *Ex Machina*, or episodes from the *Mars* mini-series. Documentary options could include *Chasing Coral*, *Chasing Ice*, *Homo Sapiens 1900*, and *The Mystery of Matter*. Students could also attend an academic lecture at a local university or museum.

**Required or Optional**

Optional

**Honors Core Values**

Engagement

**Justify how the assignment reflects the Engagement Core Value**

Field trips offer students a chance to learn history in academic spaces outside of the classroom, network with professionals in the field, and consider the real-world significance of their research.

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**Course Materials****Textbooks**

Porter, Roy (2017). *The Cambridge History of Science: Volume 4, The Eighteenth Century* Cambridge University Press. ISBN: 9781107559738

Elman, Benjamin A. (2009). *A Cultural History of Modern Science in China* Harvard University Press. ISBN: 0674030427

Baigrie, Brian (2004). *Scientific Revolutions: Primary Texts in the History of Science* Pearson Prentice Hall. ISBN: 0130990914

DeWitt, Richard (2018). *Worldviews: An Introduction to the History and Philosophy of Science* Wiley-Blackwell. ISBN: 1119118891

Daston, Lorraine and Katharine Park (2016). The Cambridge History of Science: Volume 3, Early Modern Science Cambridge University Press. ISBN: 1107553660

Jones, Alexander and Liba Taub (2018). The Cambridge History of Science: Volume 1, Ancient Science Cambridge University Press. ISBN: 0521571626

Moller, Violet (2019). The Map of Knowledge: A Thousand-Year History of How Classical Ideas Were Lost and Found Doubleday. ISBN: 0385541767

Krauss, Alexander (2025). Science of Science: Understanding the Foundations and Limits of Science from an Interdisciplinary Perspective Oxford. ISBN: 9780198937371

Belich, James (2024). The World the Plague Made: The Black Death and the Rise of Europe Princeton University Press. ISBN: 9780691219165

### **Other Resources**

Minimum Qualification

### **Class Size Information**

#### **Class Size**

40

#### **Class Size Category**

A - Lecture/discussion 40

### **Diversity and Inclusion**

**Course Design and Materials:** Course will incorporate diverse perspectives, authors, and examples that reflect a variety of cultures, identities, and lived experiences. Instructional materials will be reviewed regularly to ensure representation, inclusivity, and alignment with equity-minded practices across disciplines.

**Inclusive Learning Environment:** Instructors will establish classroom norms and policies that promote respect, civil discourse, and belonging in both online and face-to-face classes. Clear expectations for communication and engagement will support a learning space where all students feel valued and heard.

**Accessible Instruction:** Course content will be delivered using accessible design. Materials will follow accessibility guidelines within the CMS, including captioned media, readable document formats, and multiple means of engagement to support diverse learning.

**Equitable Teaching Practices:** Instructors will use transparent and grading criteria, varied assessment methods, and timely feedback to promote fairness and student success. Opportunities for revision, reflection, and multiple demonstrations of learning may be incorporated when appropriate to the discipline.

**Culturally Responsive Pedagogies:** Instructional strategies will encourage critical thinking about diverse perspectives and systems of power relevant to the course content. Faculty will foster opportunities for students to connect course material to real-world contexts.

**Ongoing Reflection and Improvement:** Faculty will engage in continuous professional development related to IDEAA principles and reflect on course practices using metacognition to identify opportunities for increased equity, inclusion, and accessibility.

#### **Explain how diversity and inclusion(e.g., gender, culture/race, sexuality, etc.) is infused into the course.**

This course affords students the opportunity to see how the elements of race, gender, ethnicity and culture have interacted in the history of science. The class explores the development and impact of political, social, and cultural trends in world societies, such as the great contributions of the Islamic empire to the West and its tolerance of multicultural science, 18th and 19th century contextualizations of gender and sex, and the impact of eugenics on the disabled and people of color. A concerted effort has been made to include elements of diversity into the course content and course assignments, where students are invited to study, research and present on these topics. Specifically, the course content was enhanced to highlight the role and impact of women as well as historically marginalized or underrepresented groups.

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**Describe how assignments, instruction, evaluation, course content, and interactions are contextualized for diverse learners promoting an equitable course.**

The instructor will present course content in different ways to accommodate for various preferred learning styles. With diverse learners in mind, a variety of accessible reading materials, films, and assignments are incorporated into this class. Assignments and projects are written to allow students to choose topics that are of interest to them. This allows students to develop as scholars, to pursue topics of particular relevance to them and to provide alternatives for topics that are particularly triggering or traumatizing.

For face-to-face or online classes, the research project can be presented through a written format or an alternative format (presentation, multimedia creation) to be determined in collaboration with the instructor(s). Formative assignments are present in the COR as low-risk assignments. This course includes small group activities, discussions, peer reviews, and assignments that emphasize a variety of ways to learn.

**Interactions****Explain how the course will incorporate student-to-student interaction.**

This course will incorporate student-to-student interaction through in-class or online discussions. Students will be able to engage in small group and whole class discussions with each other when completing collaborative learning exercises. These may focus on analysis of primary source documents and major questions related to how science and the role of science practitioners have developed in a variety of places and eras. They may also allow reflection on the role of race, class, gender and ethnicity in the history of science. These discussions will be among students themselves, enabling students to exchange ideas and to prepare for course assignments and class discussions. Students also work together on projects or other activities in small groups online or in-class, engage in peer reviews, respond to announcements, and create presentations together. Students additionally will create a presentation to teach other students about a topic they have investigated in detail.

**Explain how the course will incorporate instructor-to-student interaction.**

Faculty will deliver lectures and facilitate group discussions or activities. In lecture, faculty will have the opportunity to model a scholarly approach to analyzing historical trends and developments, and show how evidence is used to support interpretations related to the history of science. The instructor(s) will encourage and emphasize critical thinking, the value of asking questions, research skills, generation of theses, and how arguments can be successful. Faculty will offer feedback on student assignments through video conferencing software, CMS grading functionality, or individual meetings with students. Faculty will provide office hours and mid-semester check-in meetings with students. Faculty will also be available by email.

**Explain how the course will incorporate student-to-content interaction.**

Students will interact with the content through reading (the textbook and a diverse array of primary and secondary sources provided in the course), watching historically relevant films/documentaries/videos to offer a visual impression of the history of science, listening to live or recorded lectures, participating in in-class activities, by studying for and taking quizzes and the final, and through two research projects. Research projects will allow students to investigate topics of interest to themselves, beyond the typical course content, using scholarly sources and library materials (primary and secondary sources). In the process, students will acquire knowledge relevant to the course and learn research, writing, and presentation skills.

**Explain how the course will incorporate student-to-self interaction (metacognitive).**

This course will encourage students to reflect on how key events in the ongoing development of science and technology have had and continue to have a major impact on today's society and on their personal lives. Students will be encouraged during in-class and out-of-class activities to reflect on current concerns in society related to science and technology and to connect these concerns to the broad historical themes explored in the course as well as to themselves. Students will be given the opportunity to reflect on how critical thinking practiced and honed in this course can serve as transferable skills in other academic disciplines and further a student's career goals. The course also provides opportunities to confront critical issues in science involving ethics, genocide, weapons and warfare, environment concerns, racism, discrimination in the name of science, imperialism, and similar issues. The course encourages students to see these as current (not merely historical) concerns and to consider their own personal responses.