

# STEM185

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## Course Summary

**Course:** STEM185 **Title:** The History and Context of STEM

**Length of Course:** 8

**Prerequisites :** [leave blank] **CreditHours:** 3

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## Description

### Course Description:

This course offer students the opportunity to delve into the history and context of the STEM disciplines. The course will review not only the definition of STEM (Science, Technology, Engineering, and Mathematics), but the history of the individual study areas and their progression toward a unified field of study. The course will delve into the similarities that helps to unite these fields as well as the distinct differences that separate them. Students will be exposed to a wide range of topics as the course looks at different key timeframes in STEM, such as 19<sup>th</sup> century America and Europe as well as today.

### Course Scope:

This course covers the evolution of each of the STEM fields (science, technology, engineering, and mathematics) from their beginnings in ancient times to the present day. The advancements made during the scientific revolution, the industrial revolution, and the space and information ages are emphasized in particular. The course examines the role of underrepresented populations as well as the influence of society and cultural norms on the development of the STEM fields. It concludes with a look at contemporary issues relating to STEM.

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## Objectives

CO1: Demonstrate an understanding of the foundation of today's STEM practices

CO2: Develop a timeline of the key historical events involved in shaping today's STEM fields

CO3: Summarize how the field of STEM has affected underrepresented populations.

CO4: Outline interactions between social factors and STEM fields.

CO5: Demonstrate an understanding of how different STEM fields interact with each other.

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# Outline

## Week 1: Ancient Science and Technology

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### Learning Objectives:

- LO1: Summarize key developments in the early history of STEM
- LO2: Outline how STEM influenced, or was influenced by, culture or government in an ancient civilization.
- LO3: Develop a timeline of ancient STEM developments

### Reading(s)

- McClellan & Dorn, Chs. 3-9 (pick at least one chapter)
- Mayor, "Biotechné"
- Incas' Knots
- Euclid's Elements

### Assignment(s)

- Week 1 Introduction Discussion Participation, Initial post due Wednesday and Peer replies due Sunday
- Week 1 Timeline Discussion Participation, Initial post due Wednesday and Peer replies due Sunday
- Week 1 Timeline: no due date but add at least 10 events to your final timeline project

## Week 2: Science, Technology, and Mathematics: The Scientific Revolution

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### Learning Objectives:

- LO1: Summarize key STEM events in the Scientific Revolution
- LO2: Discuss how key events in the Scientific Revolution influenced, or were influenced by, European culture and institutions
- LO3: Develop a timeline of the Scientific Revolution
- LO4: Discuss interactions between mathematics and the physical sciences during the Scientific Revolution

### Reading(s)

- McClellan & Dorn, Chs. 11-13 (pick at least one chapter)
- Brecht, *The Life of Galileo*
- Kline, "The Mathematization of Science"
- Optional readings

### Assignment(s)

- Week 2 Guided Essay due Sunday

- Week 2 Timeline: no due date but add at least 10 events to your final timeline project

### **Week 3: The Industrial Revolution**

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#### Learning Objectives:

- LO1: Summarize key STEM events in the Industrial Revolution
- LO2: Outline the societal impact of key Industrial Revolution events
- LO3: Develop a timeline of the Industrial Revolution
- LO4: Discuss the relationship between science and engineering during the Industrial Revolution

#### Reading(s)

- McClellan & Dorn, Ch. 14

#### Assignment(s)

- Week 3 Timeline Discussion Participation, Initial post due Wednesday and Peer replies due Sunday
- Week 3 Timeline: no due date but add at least 10 events to your final timeline project

### **Week 4: The Second Scientific Revolution and the Rise of the University**

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#### Learning Objectives:

- LO1: Explain how universities' new emphasis on research affected STEM fields.
- LO2: Show the connection between university developments and societal impacts
- LO3: Outline the historical timeline of university development in relationship to key STEM developments
- LO4: Identify the new ways in which scientific theories began to be applied to engineering and technology starting in the late nineteenth century.

#### Reading(s)

- McClellan & Dorn, Ch. 15

#### Assignment(s)

- Week 4 Timeline Peer Review Discussion Participation, Initial post due Wednesday and Peer replies due Sunday
- Week 4 Timeline: no due date but add at least 10 events to your final timeline project

### **Week 5: The Information and Space Ages**

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Learning Objectives:

- LO1: Summarize key STEM developments of the Information Age
- LO2: Outline the societal impact of Information Age STEM advances
- LO3: Develop a timeline of the Information and Space Ages
- LO4: Identify how developments in space exploration and information technology were influenced by their social context.

Reading(s)

- McClellan & Dorn, Ch. 18, up to p. 376
- McClellan & Dorn, Ch. 19, pp. 406-14
- O'Mara, "How Stanford, Science, and War Made Tech History"
- Farmer and Markopoulou, "Collaborators in Creation"
- Optional readings

Assignment(s)

- Week 5 Guided Essay due Sunday
- Week 5 Timeline: no due date but add at least 10 events to your final timeline project

**Week 6: Underrepresented Populations in STEM**

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Learning Objectives:

- LO1: Summarize the role women have played in the development of STEM
- LO2: Examine the role of minority groups in the history of STEM
- LO3: Outline a key example of underrepresented populations in the development of STEM

Reading(s)

- Hicks, "When Winning is Losing: Why the Nation that Invented the Computer Lost Its Lead"
- Optional reading:

Assignment(s)

- Week 6 Timeline: finish your timeline and prepare a video walkthrough to share in Week 7

**Week 7: Contemporary issues relating to STEM: Science and Engineering**

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Learning Objectives:

- LO1: List continued benefits of historical scientific advances
- LO2: Outline unintended consequences of physical science developments
- LO3: Discuss a "unified" timeline of scientific advances

- LO4: Identify how a development in the physical or engineering sciences was influenced by its social context.

#### Reading(s)

- How exactly does engineering impact society?

#### Assignment(s)

- Week 7 Timeline Peer Review Discussion Participation, Initial post due **TUESDAY** and Peer replies due Sunday ○ Posts are due early this week to allow for time for peer review • Week 7 essay due Sunday

### **Week 8: Contemporary Issues Relating to STEM: Life Sciences**

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#### Learning Objectives:

- LO1: List continued benefits of historical scientific advances
- LO2: Outline unintended consequences of life science developments
- LO3: Identify how a development in the life sciences was influenced by its social context

#### Reading(s)

- McClellan & Dorn, Ch. 18, pp. 376-388
- McClellan & Dorn, Ch. 19, up to p. 406
- Unesco: Natural Sciences

#### Assignment(s)

- Week 8 Final Reflection Discussion Participation, Initial post due Wednesday and Peer replies due Sunday • Week 8 Final Timeline due Sunday

## **Evaluation**

- Timeline, including video walkthrough and peer reviews
- 3 Essays
- 6 Discussion forums

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## **Materials**

**If not using Intellus to cultivate the course materials, list any specific books, websites, etc. that will be used for the course here.**

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**Example:**

**BookTitle:** European Philosophers from Descartes to Nietzsche

**Author:** Beardsley, M C

**Publication Info:** Random House Publishing Group **ISBN:**  
9780375758041

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## Course Guidelines

### Late Work

The University encourages all work to be completed according to the course schedule. The University Late Work Policy can be found in the Student Handbook [here](#).