

# Homi Bhabha Center for Science Education Tata Institute of Fundamental Research, Mumbai

**Course Title:** Understanding Science (technology and society) through history of colours

**Course Number:** SCE701.2

**Credits:** Two

**Duration:** August 30 to December 14, 2022

**Contact Hours:** 1-2 hours discussion per week based on mutual convenience of student and instructors

**Instructor:** Ankush Gupta

## Course Objectives

- To appreciate that origin of colour is deeply related to structure and nature of matter and nature of light.
- To understand that coloured substances and coloured light(s) do not mix together in same manner
- To explore how technologies produced new colours, and also evolved with colours.
- To reflect how colour markets have changed, and have impacted society in terms of economy, human health, and environment.
- To reflect on how many diverse topics in science can be learned/taught through exploration of colours.

## About the Course

The human understanding of colours has been related to our ability to see, our ideas of light and its interaction with matter, and its relationship to our knowledge of properties of substances which we find as coloured. Colours and standardization of our definitions of colours has also played a big role in evolution of modern scientific analysis and communication (and subsequently education). What colours get used in society or in a technical field also depends on their source, price, and chemical properties. In this course, we will understand the evolution of human relationship with colours in different cultures: the physics of how colours are seen and identified; the chemistry of how new colours developed and changed the markets; the sociology of how it changed communities of its producers and consumers; and modern technologies in both scientific and day to day applications.

Key readings would be two books (complete):

1. Mary Virginia Orna (2015) The Chemical History of Color. Springer Berlin, Heidelberg.

<https://link.springer.com/book/10.1007/978-3-642-32642-4>

2. Sean F Johnston (2001) A History of Light and Colour Measurement: Science in the Shadows. Institute of Physics Publishing, Bristol and Philadelphia.

3. Michael Mark Woolfson (2016) Colour: How we see it and how we use it? World Scientific, Singapore.

In addition, there would be a few short articles to supplement some of the subtopics in these books.

Evaluation would be based on:

- 1) A mid semester exam
- 2) A term paper in the end of semester
- 3) a few very short assignments