



Online Ethics Center  
FOR ENGINEERING AND SCIENCE

# An Instructor's Guide for Ethical Issues in Physics

## Author(s)

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## Description

An excellent guide for physics instructors interested in integrating ethics into their courses.

## Body

This material is designed to provide assistance to those involved in ethics education in physics. It is not intended to be a complete discussion of all topics in ethics relevant to the physics community. Rather, it is designed to give the reader some feel for the breadth of relevant topics, to point the reader towards useful resources, and to suggest ways in which this material could be addressed in a classroom setting.

The underlying premise of this work is that much has already been written about ethics in physics, but most of this existing material is not readily located by searching on the terms “ethics” and “physics”. These chapters will not describe ethical issues and case studies in detail but instead will point the reader to sources that do supply the more detailed perspective. The intent is to identify resources that can conveniently be used as reading assignments in undergraduate or graduate level physics classes. Part of the challenge in making ethical decisions is dealing with the complexity that real-world situations introduce. For that reason, where possible sources in which physicists describe cases they have had personal

experience with will be used.

Incorporated into the description of each resource will be suggestions on how to run a class discussion based on the material. It is hard to over-emphasize the usefulness of guided classroom discussion as a means for providing multiple perspectives and further insight into ethical issues. It is helpful to ground these discussions in the professional codes discussed in Chapter 1.

## Chapter titles:

0. [Introduction: Pedagogy and Assessment](#)
1. [Ethical Codes in Physics and Related Fields](#)
2. [Laboratory Practices](#)
3. [Data: Recording, Managing and Reporting](#)
4. [Publication Practices](#)
5. [Peer Review](#)
6. [Underrepresented Groups in Physics](#)
7. [Physics and Military Research](#)
8. [Climate Change](#)
9. [Communicating Science to the General Public](#)

## Detailed Outline

### Chapter 0: Introduction: Pedagogy and Assessment

- Using case studies
- Managing class discussions
- Other activities to engage the mind
- Assessment
- About this guide

### Chapter 1: Ethical Codes

- Section 1.1: Introduction
- Section 1.2: The American Physical Society Guidelines on Ethics
- Section 1.3: Other American Institute of Physics codes

Section 1.4: Physics codes outside of the United States

Section 1.5: Codes from other fields

Section 1.6: Ethical standards implied by institutional policies

Section 1.7: Human subjects research issues: sometimes overlooked in physics

## **Chapter 2: Laboratory Practices**

Section 2.1 Introduction

Section 2.2: Research misconduct and how it harms the scientific community

Ninov

Schön

Section 2.3: Carelessness and how it harms the scientific community

Pathological science

Cold fusion

Section 2.4: Computational physics

Section 2.5: Laboratory safety

Section 2.6: How common is research misconduct in physics?

## **Chapter 3: Data: Recording, Managing, and Reporting**

Section 3.1: Introduction

Section 3.2: The lab notebook

Section 3.3: Data management and archiving

Section 3.4: Digital images

Section 3.5: Reporting results

Section 3.6: Case studies

Ninov

Schön

Millikan

## **Chapter 4: Publication Practices**

Section 4.1: Introduction

Section 4.2: Authorship

Section 4.3: Citations

Section 4.4: Plagiarism

Section 4.5: Self-plagiarism, dual submission, and fragmented publication

Section 4.6: Errata and retractions

Section 4.7: Conflicts of interest

Section 4.8: Publication metrics  
Section 4.9: Journal quality  
Section 4.10: Publication in the electronic age

## **Chapter 5: Peer Review**

Section 5.1: Introduction  
Section 5.2: Fairness  
Section 5.3 Participation  
Section 5.4: Timeliness  
Section 5.5: Confidentiality  
Section 5.6: Conflicts of interest  
Section 5.7: Career advancement  
Section 5.8: Textbooks

## **Chapter 6: Underrepresented Groups in Physics**

Section 6.1: Introduction—The need for diversity  
Section 6.2: Statistics  
Section 6.3: APS policy statements  
Section 6.4: Explicit bias  
Section 6.5: Systemic bias  
Section 6.6: Implicit bias  
Section 6.7: Programs of the American Physical Society and other organizations  
Section 6.8: Role models

## **Chapter 7: Physics and Military Research**

Section 7.1: Introduction  
Section 7.2: The Manhattan Project  
    Edward Teller  
    Leo Szilard  
    Herbert York  
    Luis Alvarez  
Section 7.3: The Strategic Defense Initiative  
Section 7.4: Arms control in the age of nuclear weapons  
Section 7.5: Dual-use technology  
Section 7.6: General discussion prompts for the entire chapter

## **Chapter 8: Climate Change**

Section 8.1: Introduction

Section 8.2: Observational data

Section 8.3: Some elements in a climate model

Section 8.4: Global Climate Models

Section 8.5: Focused action

Adaptation

Geoengineering

Mitigation

Section 8.6: Broader action on climate change

## **Chapter 9: Communicating Science to the General Public**

Section 9.1: Introduction

Section 9.2: Communicating about climate change

Section 9.3: Communicating with the media

Section 9.4: Communicating with political leaders

### **Rights**

Use of Materials on the OEC

### **Resource Type**

Instructor Materials

### **Topics**

Collaboration

Conflict of Interest

Data Management

Employer/Employee Relationships

Human Subjects Research

Mentors and Trainees

Publication Ethics

Reproducibility

Research Misconduct

Workplace Ethics

### **Discipline(s)**

Computer, Math, and Physical Sciences

Physics

Teaching Ethics in STEM

Research Ethics