



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