

Preface

Welcome to the Introductory Physics Laboratories!

Physics is an experimental science. Its theories and models are developed to explain experimental observations. New theories are generally prompted by experiments which cannot be explained with existing theories. Any *scientific* theory must make predictions which can be tested by experiment. While it may not be possible to design an experiment which proves that a new theory is correct, there must always be the possibility of an experiment which can disprove that theory. A theory which is not in this sense *falsifiable* is not a scientific theory but a *belief*. It is important that you understand this basic principle and be familiar with methods which are used to verify whether or not a theory is scientifically acceptable.

The primary purpose of these laboratories is to illustrate some basic principles of physics and the methods used to test them. During this course, you will develop skills in data collection and analysis and gain experience in estimating uncertainties in measured and derived quantities.

Science is a co-operative enterprise, a community of scientists working together. While scientists often make mistakes, they are expected to maintain the highest standards of integrity in reporting their work honestly and giving proper credit to those who have earned it. The basis of all science, and indeed of all intellectual activity, is adherence to rigorous ethical standards. To remind us all of these standards, we reproduce here the University Ethics Statement.

CWRU Ethics Statement

“These principles we strive to uphold...”

Universities seek to preserve, disseminate and advance knowledge. At CWRU, as elsewhere, we recognize that to fulfill these purposes requires a norm of expected conduct shared by all in the university community, governed by truthfulness, openness to new ideas, and consideration for the individual rights of others, including the right to hold and express opinions different from our own.

The University’s mission rests on the premise of intellectual honesty: in the classroom, the laboratory, the office, and the solitary examination desk. Without a prevailing ethic of honor and integrity not only in scientific pursuits but in all scholarly activity, the very search for knowledge is impaired. In these respects, each of us - especially but not exclusively faculty - must regard oneself as a mentor for others.

These principles we strive to uphold make it possible for the larger society to place trust in the degrees we confer, the research we produce, the scholarship we represent and disseminate, and the critical assessments we make of the performance of students and faculty, as well as judgments of staff and administrators.

To safeguard the standards on which we all depend, each of us must therefore accept individual responsibility for our behavior and our work, and refrain from taking credit for the work of others.

The culture of a university also requires that the rights of all be protected, particularly by those entrusted with the authority for judgment of the work of others.

The university being a human community is subject to human failings, ambiguities and errors. It is therefore the responsibility of the bodies regulating the affairs of faculty, students and staff to maintain processes for judging and resolving instances where these principles may have been violated. However, all such systems depend for their effectiveness, in turn, on the acceptance of common norms of conduct - the ties of trust which bind the university community together.