Introductory Physics Laboratory I (50:750:133)

Section: **Office:** TBA **Instructor:**	**E-Mail:** **Office hours:** TBA

Course website: https://canvas.rutgers.edu/

Course description: The objective of this course is to expose the student with modern research practices found in physics, engineering, and many other science-related fields. In order to get you thinking like scientists, the experiments in this course will take a deconstructed approach i.e. you will not be provided with step-by-step instructional guidance. The degree of freedom and difficulty will be increasing as the course progresses. The instrumentation, componentry, and software that you will be using this semester will be, in many cases, identical to that found in professional research/development facilities. Upon completion of the two-semester lab sequence, you should attain a set of skills and knowledge not typically achieved in introductory level courses.

Co-requisites: 50:750:204 or 50:750:132, Students *not registered for lecture will be dropped from the course.*

Course outline: The course will contain two distinct phases.

Development phase, *length ~5 weeks*, during this phase you will gain familiarity with the various experimental techniques and equipment needed to carry out your experiments *e.g.*

- Sensors/probes (photogates, strain sensors, thermocouples, and accelerometers)
- Data handling techniques, regression analysis, and statistical analysis
- Cameras and Image analysis
- Computer aided design (CAD) and 3D printing

Investigation phase, *length ~9 weeks*, during this phase you will be challenged to devise experiments to study various physical phenomena that you will be learning about in lecture e.g.

- Projectile motion
- Elastic behavior (Hooke's law)
- Conservation of Momentum
- Conservation of energy
- Simple harmonic motion
- Waves

Assessments and Grades: Your final course grade will be determined in the following manner.

- **Attendance/participation 10%** (individual)

  - You are expected to attend every class and participate. If you do not, it will be the instructor's discretion to deduct points for that day. Only written excuses from the university will be honored.
  - Part of your participation grade will include keeping your workstation and equipment organized. This will include completing a checklist of all the equipment in your workstation before and after every lab.
- **Assignments 20%** (individual/group)
  - This includes but is not limited to homework, in-class assignments, and online quizzes.
- **Experiential reports (developmental labs) 20%** (group)
  - written reports will be required of you during the Developmental Phase of the course.
- **Experimental reports (investigatory labs) 35%** (group)
- **Presentation 15%** (group)
  - The lab group will choose one DIY lab to present their experimental methods and results at the end of the semester.

A 90-100%	C 67-75%
B+ 87-89%	D 55-66%
B 80-86%	F <55%
C+ 76-79%	

Submissions and Lab Requirements: All written lab assignments must be submitted via the Sakai dropbox in Portable Document Format (.pdf). Assignments submitted in .doc or .docx file formats will not be graded. Filenames should never contain spaces, and should follow the format: labtitle.firstname-lastname.pdf

Academic Integrity Policy: Students are expected to be aware of Rutgers University's Academic Integrity Policy available at academicintegrity.rutgers.edu. Breaches of academic integrity can result in consequences ranging from reprimand to expulsion.

The use of cell phones is not permitted in the laboratory. It is expected that students will not disrupt class or lab in any way. If you do so, you will be asked to leave and will not be welcome back for the rest of the class period. You will receive a zero for any assignments that you missed as a result, and will be responsible for learning any missed material on your own. No cell phones may be used during any examination this includes their use as calculators. Calculators may not be shared during a quiz.