



Instructor: Dr. Nina Abramzon	email:nabramzon@cpp.edu
Office: Building 8 Room 224	Phone: 869-4021
Office hours: Monday 10:00-11:00 and Tuesday 1:00-2:00 or by appointment.	
Lab assistants: Sara Margala Office hours: email for appointment sgmargin@cpp.edu	
Materials: <ul style="list-style-type: none"> • Text: Detector Physics Laboratory Manual, available on the course Bblackboard site. • Course management system: "blackboard" • An available Cal Poly email account: I will email you important information. It is your responsibility to make sure that your Cal Poly email account is available 	

The course:

This course is designed to expose you to and equip you with some of the essential skills that an experimental physicist should have. It is also designed to expose you to a variety of experimental physics topics, and to provide a sense of truly independent research.

Class Hours:

Laboratory: Tue 8:00-11:50 pm room 4-3-567

Hybrid Activity: Thu 9:00-10:50 on line or room 4-3-567. Will meet in lab week 1, 7,8 ,9, and 14 with others to be added as needed

Goals of the Laboratory:

1. Learn how to calibrate spectrometers for both energy and efficiency
2. Learn about statistical uncertainty
3. Learn about peak fitting and spectroscopic analysis
4. Learn how photons interact with matter and some physics pertaining to nuclear and atomic decays

Course structure:

There are two parts to the laboratory course: (1) the In-Class lab sessions component which includes performing experiments, and (2) Hybrid (online and in class) activity component which includes preparatory work, both contribute to your final lab grade. There are total of 6 experiments. For 5 of the laboratory experiments, students will complete one preparatory lab work (worksheets are on blackboard). At the end of each lab students will produce a written report. The experiments are performed with one lab partner. There will be a midterm experiment which you will perform individually.

Grading:

6 Laboratory participation and write ups	120 points
1 Midterm Lab	20 points
5 Preparatory lab work	40 points
Total points possible	180 points



Laboratory write ups and participation:

The reports for experiment 1, 2, 4, 5 and 6 will follow the following format:

1. **Data:** The data in the form of tables and/or graphs (with errors if required) should be neatly presented.
2. **Calculations and Questions:** All calculations should be neatly presented and explained. All graphs that are required should be properly labeled. Answer all the questions.

The report for experiment 3 and 7 will be in the form of a formal lab report. You should follow the format outlined on blackboard.

Write ups are due one week after the experiment is finished. Each write up is worth 20 points.

1. Seven experiments will be done this quarter: **each student will write up his/her own laboratory report,** and is required to turn in 7 reports. **Reports must be typed.**

2. Reports are due the beginning of lab one week after the experiment is finished. Two points (i.e. 10%) will be deducted for each day that the report is late.

3. For experiments 1-6: One week after graded experiments are returned students can correct and resubmit the graded lab for up to maximum half the points lost in the first submission. When resubmitting submit the original graded lab report along with the modified lab report.

4. **Students are required to attend ALL lab meetings.** Unexcused absences are not acceptable. Each unexcused absence from a lab meeting will result in a grade reduction. See the instructor promptly with your excuse should you miss a lab meeting.

5. **Students are required to arrive to all meetings on time.** One points (i.e. 5 %) will be deducted from the total experiment grade (20 points) for each 10 min that the student is late.

6. A student who does not complete (i.e. turn in a lab report for) at least 4 out of 6 labs will receive an F grade. To erase an F grade, the student must repeat the course and perform the experiments that are offered in that course at the time the course is offered.

7. A student who submit a late lab report (100% late) may get up to $\frac{1}{2}$ the points for the experiment.

8. A student who submit 6 lab reports late (100% lost due to late submission) may still get a D for the course.

Laboratory midterm:

Students will perform experiment 4 in an exam mode working individually.

Preparatory lab work

As part of the activity online portion of the course students before each experiment students will read background materials, preform a virtual lab experiment and complete one pre-lab worksheet (materials and worksheets are on blackboard). The preparatory work is due at the beginning of lab at the start of a new experiment.



Tentative schedule:

Experiments for the first 6 weeks

Week #	Experiment	Topic
1	0	Introduction, safety, Nuclear terms
2	1	Statistical Uncertainty, Geiger Counter
3	2	Intro to MCA, Curve fitting
4	2 cont.	MCA: energy calibration experiment
5	3	MCA: efficiency calibration
6	3 cont.	Potassium Salt Experiment

Midterm exam experiment

7	4	Attenuation of Radiation in Matter
8	4 cont.	Attenuation of Radiation in Matter

In the last 7 weeks, we will use the skills we learned and apply them in the following experiments: Optical Attenuation, Helium spectrum analysis, Ge detector calibration. For the last two lab sessions you will choose and analyze an environmental sample such as a soil sample.

Experiments for the last 7 weeks

9	5	Optical Attenuation
10	5 cont.	Optical Attenuation
11	6	Calibration of Optical Spectrometer, He Spectrum
12	6 cont.	Analysis of He Spectrum
13	7	Intro to Ge detector, Energy and Efficiency Calibration
14	7 cont.	Environmental Sample Analysis
15	7 cont	Environmental Sample Analysis (If needed or make up)

Any student who feels s/he may need an accommodation based on the impact of a disability may contact me privately to discuss your specific needs, or may contact Disable Student Services at 909- 869-333

