

PHYSICS

PROGRAM REVIEW SPRING 2019

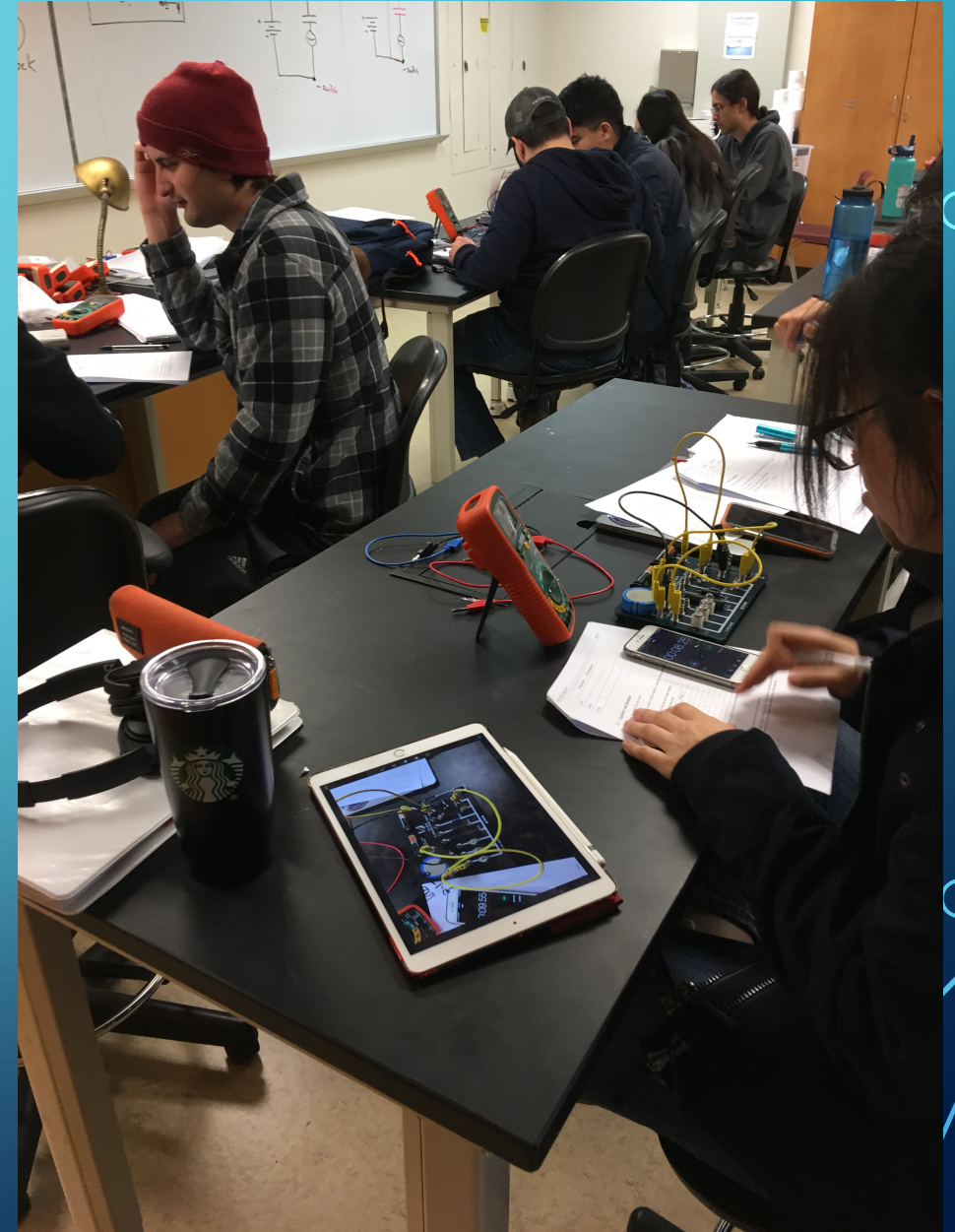


TOPICS

- Description of courses and programs served
- Enrollment trends
- Women in STEM
- Minorities in STEM
- SLO, PLO, ILO and Assessment
- Course Scheduling
- Action Plan

PHYSICS COURSE OFFERINGS

- PHYS 210 – General Physics I
- PHYS 220 – General Physics II
- PHYS 250 – General Physics I with Calculus
- PHYS 260 – General Physics II with Calculus
- PHYS 270 – General Physics III with Calculus
- PHYS 405 – Radiologic Physics



CALCULUS BASED PHYSICS IS REQUIRED FOR:

- Math
- Engineering
- Computer Science
- Chemistry
- Physics



ALGEBRA BASED PHYSICS IS REQUIRED FOR:

- Biological Sciences
- Health Science
- General Education



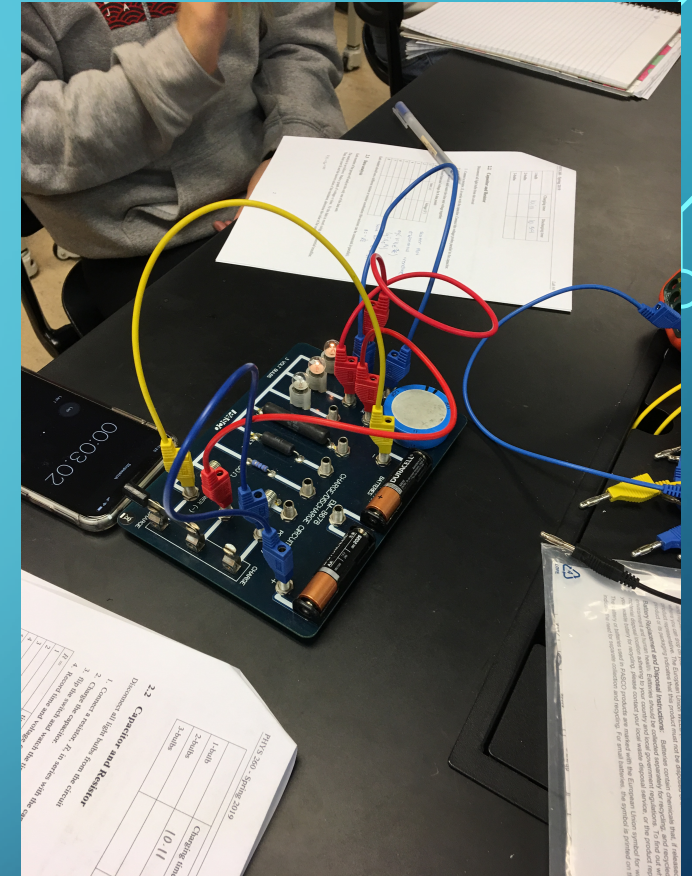
EPIC AND PHYSICS JAM

- PHYS 250
- PHYS 260
- PHYS 270



ENROLLMENT TRENDS

- The total number of students is decreasing
- Average load 412.
- Average fill rate 83%
- The percentage of women completing PHYS 270 is constant at 23%



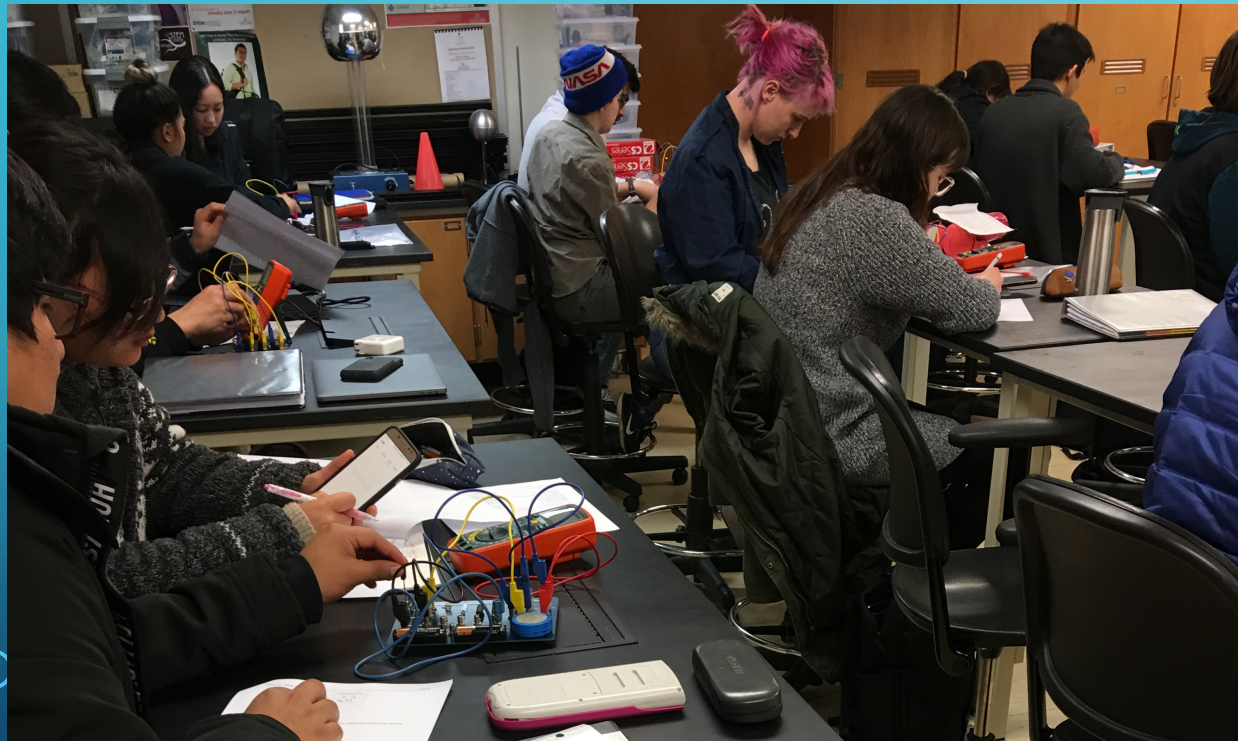
SUCCESS AND RETENTION

- The average success rate 70.7%
The average retention rate 80.7%

	Success Rate	Standard Deviation
PHYS 210	65%	19%
PHYS 220	79%	10%
PHYS 250	58%	13%
PHYS 260	65%	15%
PHYS 270	87%	8%

PHYSICS 260 - GENERAL PHYSICS II

ELECTRICITY AND MAGNETISM



Number of students
is down

Fraction of females
in calculus based
physics is approx.
constant at 23%

Equity Supplement Gap Analysis for Program Review

Academic Year: 2017-2018

Physics

Groups Experiencing an Equity Gap—Program Access Rates

Groups highlighted below have an equity gap of 3 percentage points or more as identified in tables 1 and 2 on pages 2-3.

Female
students

30.4%
Access rate
Physics



Compared to

60.4%
Access rate
Cañada



-30.0%
Equity
Gap

It takes

76
students
to close the gap

Groups Experiencing an Equity Gap—Program Course Completion Rates

Groups highlighted below have an equity gap of 3 percentage points or more as identified in tables 3 and 4 on pages 3-4.

For more details on numbers of students and ethnicity by gender gaps, please refer to table 4 on page 3.

Male
students

68.7%
Completion
rate
Physics



Compared to

73.5%
Completion rate of
all students in
Physics



-4.8%
Equity
Gap

It takes

7
students
to close the gap

EQUITY FOR HISPANIC STUDENTS

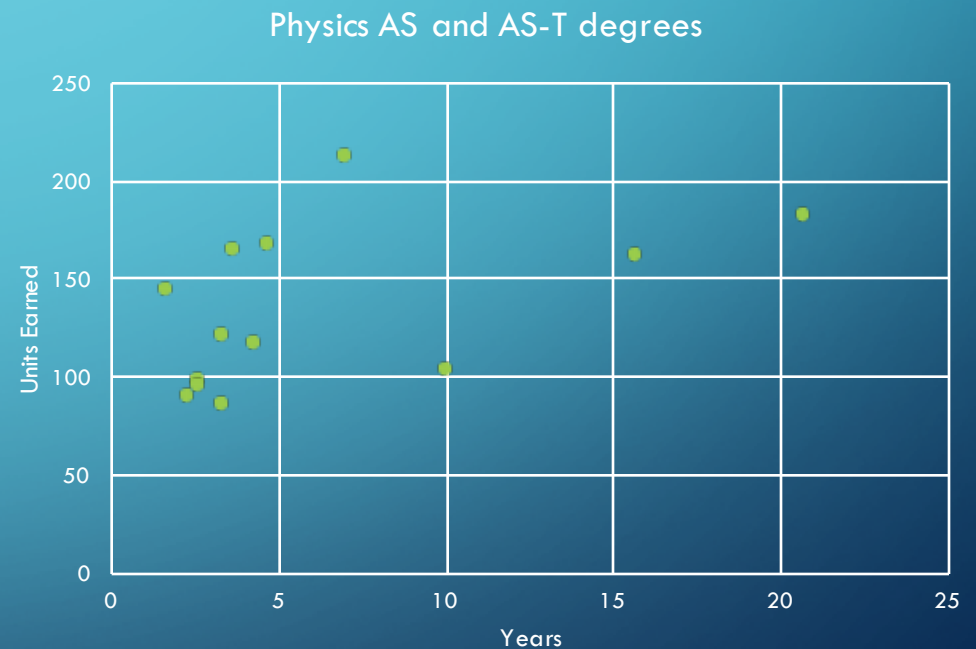
- Hispanic Males 10% of College Students
- Hispanic Males 19% of Physics Students
- Hispanic Females 18% of College Students
- Hispanic Females 6.7% of Physics Students
- Hispanic Male success rate 50%
- Hispanic Female success rate 95.5%

PHYSICS AS & AS-T DEGREES (LAST 5 YEARS)

Physics AS & AS-T	F	M
Non (White non-Hispanic)	3	10
White non-Hispanic	0	3

PHYSICS AS & AS-T DEGREES (LAST 5 YEARS)

	Units	Years
Minimum	86	1.67
1st quartile	95	2.67
Median	121	3.67
3rd quartile	164.5	7
Maximum	212.5	20.7



SLO'S

- Most SLO's are assessed using embedded question in the exams
- Some SLO's are assessed using the student's submitted lab reports

SLO'S PHYS 250 (OLD)

- Analyze the motion of a body (rotational or linear) in terms of momentum, kinetic energy, and potential energy.
- Perform an analysis of a physical system in terms of forces, velocities, displacements and accelerations and time using Newton's laws.
- Setup, perform, analyze, and document an experiment.

SLO'S PHYS 250 (NEW)

- Draw on conceptual understanding of physics to explain various real-world phenomena related to Newtonian mechanics.
- Apply mathematical techniques, as appropriate to the course level, to quantitatively analyze real-world phenomena related to Newtonian mechanics.
- Use laboratory equipment to collect and process data and apply appropriate equations to calculate results for experiments related to Newtonian mechanics.
- Interpret experimental data for trends and deduce their connection with theories of Newtonian mechanics, including identifying sources of experimental error.

PHYS 260

- Analyze and explain the behavior of simple AC & DC circuits with resistors, capacitors, and inductors
- Analyze electric forces and fields created by a system of charged particles
- Solve problems involving induced electric and magnetic fields

SLO'S PHYS 270

- Analyze the reflection and refraction of light in terms of geometrical optics in different media.
- Perform an analysis of isobaric, isochoric, isothermal and adiabatic processes in their relation to work, heat transfer, and changes in internal energy.
- Explain the principle assumptions of Special Relativity and able to perform calculations involving relativistic kinematics.
- Describe the photo-electric effect, the Compton effect, quantization of energy and the Bohr model of the atom.

SLO ASSESSMENTS

Induction - Solve problems involving induced electric and magnetic fields

SLO Status: Active

Start Date: 08/01/2009

End Date: 01/01/2025

Exam - Questions embedded in exams

Success Criterion: Average Score will be $\geq 70\%$

Schedule: Every odd year spring semester (Spring 2009, 2011, 2013...)

Reporting Cycle: 2017- 2018

Result Type: Criterion met
73% (10/25/2018)

Reporting Cycle: 2015- 2016

Result Type: Criterion met
71% (05/28/2016)

Reporting Cycle: 2010 - 2011

CAN PHYS 250 :Physics with Calculus I

<i>SLOs</i>	<i>Assessment Methods</i>	<i>Results</i>	<i>Actions</i>
<p>Newton's Laws - Perform an analysis of a physical system in terms of forces, velocities displacements and accelerations and time using Newton's laws.</p> <p>SLO Status: Inactive</p> <p>Start Date: 01/01/2010</p> <p>End Date: 01/01/2018</p>	<p>Exam - Embedded Questions in Exams</p> <p>Success Criterion: The class average will be 70% or greater</p> <p>Schedule: Every even year spring semester (Spring 2010, 2012, 2014)</p>	<p>Reporting Cycle: 2016- 2017</p> <p>Result Type: Inconclusive</p> <p>63%. Sample size: 29 students (from two sections) who finished the course with a passing semester grade. Based on raw (not curved) score of selected relevant questions on final exam. (06/05/2017)</p>	<p>Action: While on first sight this is a low percentage, it is based on raw, non-curved results. The final exam also seemed to be an anomaly for the semester, having had a noticeably lower score than midterm exams. This is a telltale sign that the exam questions on both the final exam, and midterms need to be re-examined. (06/05/2017)</p> <p>Action Plan Category: Develop new evaluation/ assessment methods</p>

ILO and PLO

CAN - 00 - Institutional Learning Outcomes (... ▼)	PLOs		
ILOs/Goals	scientific method Students completing this program will be able to use the scientific method ...	communicate Students completing this program will demonstrate the ability to document and ...	analyze physical systems Students completing this program will demonstrate critical thinking and ...
CAN ILO #1 - Critical Thinking Select, evaluate, and use information to investigate a point of view, support a conclusion, or engage in problem solving.	✓		
CAN ILO #2 - Creativity Produce, combine, or synthesize ideas in creative ways within or across disciplines.			
CAN ILO #3 - Communication Use language to effectively convey an idea or a set of facts, including the accurate use of source material and evidence ...		✓	
CAN ILO #4 - Community Understand and interpret various points of view that emerge from a diverse world of peoples and cultures.			
CAN ILO #5 - Quantitative Reasoning Represent complex data in various mathematical forms (e.g., equations, graphs, diagrams, tables, and words) an ...	✓	✓	✓

COURSE SCHEDULING

- Physics Courses are primarily in the morning to minimize conflict in the student's schedules with Math, Engineering, and Chemistry
- Suggestion: STEM courses as a group may need to reconsider the schedule to maximize student access. The use of Friday labs and classes as well as hybrid courses should also be reconsidered.

FALL SCHEDULE

Fall					
	Monday	Tuesday	Wednesday	Thursday	Friday
8:10	P210 Lab (16-106)	P250 Lab (16-106) P260 Lab (16-108)	P210 Lab (16-106)	P250 Lab (16-106) P260 Lab (16-108)	
9:45	P210 Lecture	P260 Lecture P250 Lecture	P210 Lecture	P260 Lecture P250 Lecture	
11:10	P405	P260 Lab (16-108) P250 Lab (16-106)	P405	P260 Lab (16-108) P250 Lab (16-106)	
6:00pm	P210 Lab		P210 Lecture		

SPRING SCHEDULE

Spring					
	Monday	Tuesday	Wednesday	Thursday	Friday
8:10	P270 Lab (16-108)	P250 Lab (16-106)	P270 Lab (16-108)	P250 Lab (16-106)	
9:45	P270 Lecture	P260 Lecture P250 Lecture	P270 Lecture	P260 Lecture P250 Lecture	
11:10	P270 Lab (16-108)	P260 Lab (16-108) P250 Lab (16-106)	P270 Lab (16-108)	P260 Lab (16-108) P250 Lab (16-106)	
6:00pm	P220 Lab		P220 Lecture		

ACTION PLAN

- 1) Explore the need for and effectiveness of an auxiliary physics course or courses to help improve student success in PHYS 210 and PHYS 250.
- 2) Continue working with ACES and the IWITTS program to assess and develop classroom strategies for the retention of women in our courses.
- 3) Continue to work to identify and reduce equity gaps and barriers to success for all students

END - THANK YOU

