

ANGELO STATE UNIVERSITY
2016 Physical Science in Colombia Program at the Universidad de Antioquia
Summer II term, 2016

Director: Dr. Juan Blandon

Courses

PS 3311 – Advanced Physical Science Concepts I

PS 3312 – Advanced Physical Science Concepts II

PS 3311

Course Description

This course has a strong community engagement component. It is a study of physical systems and subsystems, interactions, measurements, unit systems, motion, forces, energy, properties of matter, and Earth sciences. Students will attend meetings with professors, students, and K-12 teachers at the Universidad de Antioquia campus, and will visit K-12 schools in the area. Students will gain experience explaining the physics demonstrations to K-12 students, university students, and professors. Students will learn how to explain the underlying physics principles of the demos to different audiences, and how to modify the demos for teaching purposes. They will also learn how to build/assemble the demos and how to find the building materials.

Instructor Information

Juan Blandon, Ph. D.

Email: jblandon@angelo.edu

Office: VIN 123

Course Information

Text: PS 3311 Advanced Physical Science, v5.0 (workbook), 3-Ring Binder (1.5")

Calculator: 4-function calculator

Course Attendance

Course attendance is the responsibility of the student. Excessive absences will not result in a student being dropped from the course. Attendance will be taken in class. Students are expected to be in class for the full time. Students missing more than 10 minutes of class will receive a zero participation grade for that day. Every 3rd absence will result in the loss of a letter grade.

Late Work Policy

Homework is due on the assigned date. No late submissions will be accepted. The only exceptions granted are for university excused absences and religious holidays in which I am

notified in advance. *Participation grades may only be earned in class on the day of the activity.*

Course Evaluation

Course grades are a culmination of activities and exams. Activities include homework, in-class participation grades, journal entries, and projects. There will be a total of three exams including the final. Activities and participation account for 50% of the final grade and exams count for 50%. I do reserve the right to rescale grades as I see fit at any time during the semester. Final grades will be assigned as follows:

F ≤ 59%

D ≤ 69%

C ≤ 79%

B ≤ 89%

A ≥ 90%

Course Objectives & Student Learning Outcomes

The objective of the study of the physical sciences component to the major curriculum for teacher education is to ensure excellence in the instruction of natural science objectives by the teachers in the State of Texas. Specific outcomes and objectives include that the student will:

1. Understand and apply appropriate methods and technology to the study of the natural sciences.
2. Recognize scientific and quantitative methods and the differences between these approaches and other methods of inquiry and to communicate findings, analyses, and interpretation both orally and in writing.
3. Demonstrate technical and analytical skills appropriate to a future career in teaching by engaging in quantitative laboratory experimentation.
4. Demonstrate the intellectual ability to translate, interpret, and extrapolate the most important scientific models and laws governing electricity and magnetism, light and optics, and astronomy.
5. Further develop critical thinking and problem solving skills in the area of physics and the natural sciences.
6. Be able to teach physical science to K-12 students using fun, effective, interactive, and low-cost physics demonstrations that can be resourcefully built using materials found locally.
7. Improved understanding of impact of STEM education on helping societies develop.
8. Improved understanding of the cultural influences in K-12 science education in Colombia.

Social Responsibility Goals

By the end of this course the student will:

- Be able to explain basic physics concepts to children in post-conflict and under-served communities using engaging demonstrations
- Have a thorough understanding of water filtration and its impact on vulnerable post-conflict communities.
- Be familiar with the steps necessary to install a water filtration system in a post-conflict community

- Demonstrate intercultural awareness and communication as a “physical science ambassador.”
- Tailor communication strategies based on cultural norms and values to foster dialogue.
- Demonstrate effective engagement in the post-conflict and under-served communities, both locally and globally, by proposing practical science-based solutions to communities facing pressing K-12 science educational and water access problems.

Students with Disabilities

Angelo State University complies with Section 504 of the Vocational Rehabilitation act of 1973 and the ADA of 1990. Students with special needs or issues pertaining to access and participation in this class must contact me immediately. Further, you may call the Student Life Office at 325.942.2191 (UC Rm. 112) to request assistance and accommodations.

Classroom Etiquette

Teams of four students will conduct the investigations. Team assignments will be made at the beginning of the term and will be changed regularly during the term. No cell phone, music players, or recording devices will be allowed in class. Exceptions to recording devices may only be made for students with a disability waiver. Any student not respecting the learning environment and the learning process of their peers will be asked to leave the course.

Academic Honesty

Angelo State University expects its students to maintain complete honesty and integrity in their academic pursuits. Cheating will not be tolerated in any form. It is the responsibility of the student to understand and comply with the University Honor Code, available online here: www.angelo.edu/forms/pdf/Honor_Code.pdf

Meetings at ASU

Feb 3: trip orientation, general travel information, course introduction and safety

Feb 10: U1-U5

Feb 17: U6-U7

Feb 24: M1-M3

March 2: M3-M6 (skype call with U.A. Mech. Engineering)

March 23: M6-M9 (skype call with U.A. Physics)

March 30: M9-M10, Review

April 6: **Exam 1 (U, M)**

April 13: F1-F3, Return Exam 1

April 20: F4-F5

April 27: F6-F9

May 3: Pre-trip last meeting, discuss travel logistics

July 5– arrive in Medellin, Colombia. Stay at Estadio hotel. Rest.

July 6 – campus tour, city tour, go over campus and city logistics

Course Schedule in Colombia

(Legend: U = Units and Measurements, M = Motion, F = Force, E = Energy, PM = Properties of Matter, ES = Earth Science)

Week	Dates	Class Schedule
1	W 06 July	12-6PM: Welcome reception at Botanical Garden (stud. reps., Jaime, Boris, Johnny, Ruta N reps., community reps.) Tour of UdeA classrooms and campus, tour Parque Explora, Planetarium, Ruta N, Biblioteca Espana
	R 07 July	7:30 AM pick-up F9, F10, E1-E4 12-2PM: lunch fiambre by soccer fields with stud reps. 2-4PM: roundtable (drug history/culture in prep for weekend excursion) with students and social/political science professor
	F 08 July	E5-E7, Review 12-4PM: Lunch at Plaza Mayor. Go to Museo del Agua, walk to Parque Bolivar 4-8PM: Visit 'El Centro.' Ride tram, buy souvenirs, eat traditional Colombian meal (Weekend excursion to Rio Claro 7/10, Parque Arvi/Parque de las Aguas in Barbosa 7/9)
2	M 11 July	Exam 2 (F,E) Meet U.A. professors (Boris) and students (Johnny Castrillon) to discuss K-12 education
	T 12 July	PM1- PM7, Return Exam 2 12-2PM: lunch fiambre by soccer fields with stud reps. 2-4PM: roundtable with students (Cabilo/Afro-Colombian/Barrio) and social/political science professor
	W 13 July	PM8-PM11 Demos design and exchange with UA students and professors Ruta N K-12 engineering/physics challenge
	R 14 July	ES1-ES5, Meeting with local K-12 teachers, classroom visit
	F 15 July	First set physics shows at Granizal K-12 schools (Weekend excursion to Guatape (7/17))
3	M 18 July	ES6-ES9, Review Visit Medellin Makerspace
	T 19 July	Exam 3 (PM, ES) 12-2PM: lunch fiambre by soccer fields with stud reps. 2-4PM: roundtable with students (Cabilo/Afro-Colombian/Barrio) and social/political science professor "Official Welcome"
	W 20 July	Holiday Meeting with U.A. students and professors to discuss physics show 12-2PM: lunch fiambre by soccer fields with stud reps. 2-4PM: roundtable with students (Cabilo/Afro-Colombian/Barrio) and social/political science professor

	R 21 July	Second meeting with local K-12 teachers, <i>classroom visit</i> Second set physics shows at Sto. Domingo K-12 schools Ruta N K-12 engineering/physics challenge
	F 22 July	(Weekend tour of 'Eje Cafetero' and Termales de Santa Rosa de Carval 7/22-7/25)
4	M 25 July	
	T 26 July	
	W 27 July	Ruta N K-12 engineering/physics challenge
	R 28 July	
	F 29 August	Meeting with U.A. students and professors to discuss physics show (Afternoon/Weekend excursion to Feria de las Flores/Santa Lucia)
5	M 01 August	Final meeting with local K-12 teachers, <i>classroom visit third set of shows at area K-12 school</i>
	T 02 August	Roundtable discussion, final thoughts, <i>reflective essay</i> teaching physical science to K-12 students using physics demonstrations and the cultural influences in K-12 science education in post-conflict Colombia
	W 03 August	Final meeting with U.A. professors and students Farewell activity (in Rio Negro? Tutucan?) Leave for airport at 8PM
	R 04 August	Arrive in Austin in the evening
	F 05 August	

PS 3312

Course Description

This course has a strong community engagement component. It is a study of physical systems and subsystems, interactions, measurements, electricity, electric circuits, magnetism, light, optics, and astronomy. Concepts will be taught through the design, implementation, maintenance, and troubleshooting of a water filter that will be installed in an under-served community in Colombia. Emphasis will be placed on energy efficiency, energy conservation, safety, and access and their relation to area communities' quality of education. Students will improve their understanding of the area through pre-travel research, on-site meetings with professors, students and community leaders working on energy-related projects. We will arrange visits to an under-served local community where the filter will be installed. Students will practice explaining the power generator design, implementation, troubleshooting and maintenance to local students.

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2. Recognize scientific and quantitative methods and the differences between these approaches and other methods of inquiry and to communicate findings, analyses, and interpretation both orally and in writing.
3. Demonstrate technical and analytical skills appropriate to a future career in teaching by engaging in quantitative laboratory experimentation.
4. Demonstrate the intellectual ability to translate, interpret, and extrapolate the most important scientific models and laws governing electricity and magnetism, light and optics, and astronomy.
5. Further develop critical thinking and problem solving skills in the area of physics and the natural sciences.
6. Use the design and implementation of solar power generators to study underlying physics principles and how this technology facilitates science education, community interconnectivity and growth in Colombia.
7. Improved understanding of impact of STEM on developing technologies that help communities grow.
8. Improved understanding of area communities' needs for clean and efficient water filtration.

Social Responsibility Goals

By the end of this course the student will:

- Have a thorough understanding of water filtration and its impact on post-conflict and under-served communities.
- Be familiar with the steps necessary to install a water filtration system in a vulnerable post-conflict community
- Demonstrate intercultural awareness and communication as a “physical science ambassador.”
- Tailor communication strategies based on cultural norms and values to foster dialogue.
- Demonstrate effective engagement in the post-conflict and under-served communities, both locally and globally, by proposing practical science-based solutions to communities facing pressing water access problems.

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Meetings at ASU

May 3: Pre-trip meeting, discuss travel logistics

July 5 – arrive in Medellin, Colombia. Rest.

July 6 – campus tour, city tour, go over campus and city logistics

Course Schedule in Colombia

(Legend: E = Electric Charge, EC = Electric Circuits, M = Magnetism, L = Light and Color, O = Optics, A = Astronomy)

Week	Dates	Class Schedule
1	W 06 July	Welcome reception at U.A.
	R 07 July	
	F 08 July	
2	M 11 July	Water filter design and implementation: Meeting with U.A. students and professors to discuss water filter project
	T 12 July	
	W 13 July	Water filter design and implementation Meeting with U.A. students and professors: First water filter installation/community interaction in Granizal
	R 14 July	E1- E5; Lecture with U.A. professors and students
	F 15 July	E5, EC1- EC6; Meeting with U.A. students and professors: Second water filter installation/community interaction Granizal
3	M 18 July	EC7-EC10, Review
	T 19 July	Exam 1 (E, EC) Visit U.A. physics and engineering research labs
	W 20 July	Holiday: Exam 1 Return

		<i>Meeting with U.A. students and professors: Third water filter installation/community interaction Granizal</i>
	R 21 July	M1-M6 <i>Meeting with U.A. students and professors: Fourth water filter installation/community interaction Sto. Domingo</i>
	F 22 July	Eje Cafetero
4	M 25 July	L1- L6
	T 26 July	L7, L8, Review; <i>Meeting with U.A. students and professors: Fifth water filter installation/community interaction Sto. Dom.</i>
	W 27 July	Exam 2 (M, L) <i>Meet U.A. students/professors at Medellin Planetarium to take out telescopes for view of southern skies</i>
	R 28 July	O1-O4, Exam 2 Return Exam 2
	F 29 July	O6-O7, <i>Meeting with U.A. students and professors: Sixth water filter installation/community interaction Sto. Dom</i>
5	M 01 August	O8, O9, A1, A2
	T 02 August	A3-A5, Review Exam 3 (O, A) (8:00 – 10:00 am) Roundtable discussion, final thoughts, reflective essay on use of water filter to study underlying physics principles and how this technology facilitates science education, community interconnectivity and growth in post-conflict Colombia.
	W 03 August	<i>Final meeting with U.A. professors and students</i> <i>Farewell activity (in Rio Negro? Tutucan?)</i> Leave for airport at 8PM
	R 04 August	Return home
	F 05 August	