

PHYSICS 290M: SERVICE LEARNING OUTREACH -
DEVELOPMENT of TEACHING UNITS ON THE UNIVERSE

Contact Information

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COURSE DESCRIPTION

This course is designed for those interested in sharing their interest and talent with science and education with K-12 students and teachers. The intent is to provide Physics 290M students with opportunity to share their knowledge, expertise, enthusiasm, and experience in developing sample lessons and activities to accompany them, in relation to the subject of “the universe”.

The goals of the class are two-fold: 1) to provide truly needed service to the community and 2) to provide you, the student, with opportunity to learn from your involvement in this course. You will gain experience in presenting topics and concepts about the universe, sometimes to folks with little knowledge of science. In so doing, you will learn how to “think on your feet” with using analogies and metaphors to help make your point. You will have the opportunity to influence impressionable young people to consider the study of science. More importantly, you will have the opportunity to offer assistance to teachers that will benefit from the lessons you will develop and will be able to teach about the universe with more confidence and enthusiasm. Goals of the course include:

- To develop and deliver teaching units on the subject of the universe to K-12 classrooms.
- To enhance student learning by joining theory with experience and thought with action.
- To fill unmet needs in the community through direct service that is meaningful and necessary.
- To enable students to help others, to give of themselves, and to enter into caring relationships with others.
- To assist students to see the relevance of the academic subject to the real world.
- To develop an environment of collegial participation among students, faculty, and the community.
- To give students the opportunity to do important and necessary work.
- To increase the civic and citizenship skills of students.
- To expose students to societal inadequacies and injustices and empower students to remedy them.
- To develop a richer context for student learning.
- To provide cross-cultural experiences for students.

- To give student greater responsibility for their learning.
- To help students know how to get things done!
- To impact local issues and local needs.

PREREQUISITES

Desire. What you get out of this course depends upon what you put into it.

CONTENT AND LEARNING ACTIVITIES

This course is scheduled to allow weekly meetings on Thursday afternoons, 1:30 p.m.-2:20pm., as needed. Those enrolled will work collaboratively and independently, with the instructor serving as a facilitator, to help locate resources needed, to develop and/or deliver units of instruction that will be used in classroom and public venues during the upcoming school year. Participants will be introduced to the resources at Shared Informational Services, as well as the library of resources available through the physics department. In addition, participants will receive help constructing demonstrations or hands-on activities they may wish to incorporate into their projects.

ASSESSMENTS

Progress is monitored on an ongoing basis. Each week, participants will gather to exchange progress and obstacles, allowing one another to provide feedback, ideas, and support. There are no formal exams. However, participants must maintain a journal, identifying what they have learned and including all resources and citations/acknowledgement of material they are incorporating from a wealth of books, Internet sites and other sources. Typical weekly assignments could include readings, development of activities, research on needs and available resources. To be deemed “successful,” participants must be able to show active participation in class (maintaining a 90% attendance rate in class and participating in visits to schools).

THE TEXT

This course does not require a particular text. Rather, participants will be provided with some basic papers and other means of information (extracts from books, movies, presentations,

etc) through which they will learn the contents related to the development of teaching units and questions related to the universe. Students are encouraged to explore a plethora of available resources from the department and from Shared Information Services.

GRADES

Participants must create at least one completely documented teaching unit. This will end up being the result of a collaborative effort among all students involved in the course. Grades are based on accumulated points. Points will be awarded in each of the categories below and weighted accordingly.

Active participation in class and/or external visits to schools or other outreach activities	50 percent
Journal (see description below)	10 percent, reviewed weekly
Write up/discussion on readings or other learning resources (videos, presentations, etc)	10 percent
Development of activities (individual or in groups)	20 percent
Other assignments	10 percent
Class attendance	minimum 90% to earn a C

Reflection: Learning While Serving

*"Experience is not what happens to a man;
it is what a man does with what happened to him." Aldous Huxley*

Community service, in itself, can be meaningful, pointless, or harmful. Reflection is the key to getting meaning from your service experience. What is reflection? Reflection is a process by which service-learners think critically about their experiences. Reflection can happen through writing, speaking, listening, and reading about the service experiences. Why is reflection important? Learning happens through a mix of theory and practice, thought and action, observation and interaction. It allows students to learn from themselves.

What Should I Write in My Journal?

Here's a few of the ingredients which go into a keeping a great journal:

- Journals should be snapshots filled with sights, sounds, smells, concerns, insights, doubts, fears, and critical questions about issues, people, and, most importantly, yourself—as related to the content and concepts of the course.
- Honesty is the most important ingredient to successful journals.
- A journal is not a work log of tasks, events, times and dates.
- Write freely. Grammar/spelling should not be stressed in your writing until the final draft.
- Write an entry after each visit. If you can't write a full entry, jot down random thoughts, images, etc. which you can come back to a day or two later and expand into a colorful verbal picture.

Structuring Your Writing:

- Use the journal as a time to meditate on what you've seen, felt, and experienced, and which aspects of the learning and/or volunteer experience continues to excite, trouble, impress, or unnerve you.
- Don't simply answer the questions listed below, but use the questions as a diving board to leap from into a clear or murky pool of thought. Use the questions to keep your writing/"swimming" focused.
- Final journals need to be edited for proper grammar and spelling.

The Three Levels of Reflection

- **The Mirror (A clear reflection of the Self)**
Who am I? What are my values? What have I learned about myself through this experience? Do I have more/less understanding or empathy than I did before volunteering? In what ways, if any, has your sense of self, your values, your sense of "community," your willingness to serve others, and your self-confidence/self-esteem been impacted or altered through this experience? Have your motivations for volunteering changed? In what ways? How has this experience challenged stereotypes or prejudices you have/had? Any realizations, insights, or especially strong lessons learned or half-glimpsed? Will these experiences change the way you act or think in the future? Have you given enough, opened up enough, cared enough? How have you challenged yourself, your ideals, your philosophies, your concept of life or of the way you live?
- **The Microscope (Makes the small experience large)**
What happened? Describe your experience. What would you change about this situation if you were in charge? What have you learned about this agency, these people, or the community? Was there a moment of failure, success, indecision, doubt, humor, frustration, happiness, sadness? Do you feel your actions had any impact? What more needs to be done? Does this experience compliment or contrast with what you're learning in class? How? Has learning through experience taught you more, less, or the same as the class? In what ways?
- **The Binoculars (Makes what appears distant, appear closer)**
From your service experience, are you able to identify any underlying or overarching issues which influence the problem? What could be done to change the situation? How will this alter your future behaviors/attitudes/and career? How is the issue/agency you're serving impacted by what is going on in the larger political/social sphere? What does the future hold? What can be done?

EVERYDAY during your project you will write in your journal. For some entries you may simply be summarizing what you did for the project that day. But the journal involves much more than that! You should also use it as a place to:

- Ask yourself questions about the project
- Work out ideas and record your insights
- Think about what you are reading
- Plan for the next day and week
- Express your feelings about the project
- Record ideas for writing your lesson unit(s)

GUIDELINES:

1. Get a loose leaf binder—the kind where you can add and remove pages. Get the **SMALL, PORTABLE** size, **NOT** the big kind that students usually use for classes.
2. For each entry, at the top of the page, record the day, date, and time. Also put a **HEADING** at the top of the page.
3. Number all the pages consecutively.
4. At the beginning of the journal, keep a **TABLE OF CONTENTS**. This table will be a list of all the entry headings and their corresponding page number.
5. Always bring your journal to our meetings.
6. Fasten this handout to the inside of your journal.

WRITE EVERY DAY!

Teaching, in itself, can be meaningful, pointless, or harmful. Reflection is the key to getting meaning from your science teaching experience. What is reflection? Reflection is a process by which teachers-as-researchers think critically about their experiences. Reflection can happen through writing, speaking, listening, and reading about their science teaching experiences. Why is reflection important? Learning happens through a mix of theory and practice, thought and action, observation and interaction. It allows teachers to learn from themselves.

You must write in the journal every day. Long entries may be several pages. Short entries may be as brief as half a page. Write even if you did not work on the project that particular day. You may still have ideas, plans, or feelings about the project!

Even if you have no idea what to write, **STILL WRITE!** Write about **WHY** you had no ideas or insights about your teaching from that day, how you felt about that, what you might do to get some ideas, etc. If you have to, simply write, “I don’t know what to write” over and over again until something, anything, comes to you. I mean it!

If you’re stuck or if the spirit moves you, you may even write about things that **SEEM** unrelated to the project—for example, what you did that day, positive or negative things that happened to you. After all, physics is observing the world around you to understand how it works. You may be surprised! **THESE THINGS ACTUALLY MAY BE INFLUENCING YOUR PROJECT IN IMPORTANT WAYS!**

Possible Headings

Listed below are some examples of headings that might appear in your journal. The ones with an asterisk (*) are important, and should appear in your journal at regular intervals:

- * Meeting with Julie/Laura
- * After meeting with Julie/Laura
- * What I want to accomplish...tomorrow...next week...
- * Didn't understand _____
Should learn more about _____
I did it!
- * Reactions to (reading title)
- * Something I have to ask Julie/Laura
- I hate this project!
- Feeling Enthusiastic