



## Physics 310: Readings for Teaching High School Physics

Spring 2017.

**Instructor:** Dr. Rebecca Rosenblatt

**Office:** 313A Moulton Hall

**Phone:** (309) 438-5070

**Email:** rjrosen@ilstu.edu

**Office Hours:** (by appointment)

### Course Meeting Times:

Lab: W Moulton Hall Room 214, 5:30pm - 8:30pm

### Course Goals:

This course provides essential background for teaching high school physics that centers around developing scientific literacy in students. It will provide students with philosophical and pedagogical background in the teaching of physics. The course as such is built around both pedagogical knowledge - a knowledge of generic teaching practices - and pedagogical content knowledge - a knowledge of how to actually teach the content of physics. Physics content knowledge per se is assumed.

This course is based on the belief that **teachers must act on grounded principles, and not arbitrarily**. What teachers do as they present their lessons should be rooted deeply in their attitudes about issues that concern them, their students, the scientific profession, and society -- balancing declarative knowledge with procedural knowledge, balancing expository teaching with inquiry learning, balancing depth of coverage with breadth of content, emphasizing learning over teaching, and knowing what values and knowledge are worth learning in light of national and state standards, and the needs of the student and society.

### Methodology:

This course will have a learning environment that is student centered, knowledge centered, assessment centered, and community centered. This course will be **student centered** to the extent that the teacher builds on knowledge students bring to the learning situations. This course will be **knowledge centered** to the extent that the teacher helps students develop an organized understanding of important concepts in the physics teaching discipline. This course will be **assessment centered** to the extent that the teacher makes students' thinking visible so that ideas can be presented and verified. This course will be **community centered** to the extent that the teacher establishes classroom norms that learning with understanding is valued and students feel free to explore what they do not understand.

Emphasis will be placed on an **Assessment-for-Learning Policy**. That is, assessments of student performance will be used not only to assign grades, but to improve student performance. A student's scores can be improved following appropriate revision and resubmission of "unsatisfactory" course projects, so long as deadlines are met. Consistent with the Assessment-as-Learning Policy, students are encouraged to submit drafts of the main project for review by the course instructor, and make revisions based upon the instructor's written comments prior to the submission deadline. **Please keep in mind**

**that the very best papers/projects in this course typically have been produced by students who submit their papers/projects for review before submitting the final copy.**

**This is a "readings heavy" course; students must keep up with daily reading requirements. This course can be overwhelming due to the heavy work load; don't fall behind.**

### **Group Work:**

Students are encouraged to discuss the readings with each other and assist and give feedback to students as they create their papers and presentations. However, each student must turn in his or her own unique papers and projects.

### **Comment on late work:**

**Late submissions are not accepted** unless the student has received permission from the instructor prior to the deadline. Most of the work will be submitted via reggienet's drop box. It is the students' job to make sure that the file they upload is there and the correct file by the deadline.

Class participation is a large part of the grade and we only meet once per week. This means that it is important for students to be at, and on time, to each class period.

### **Weighting and Grading:**

<b>Assignment</b>	<b>% Course Grade</b>
310A: Participation in class discussions and activities	20%
310B: Discussion Leader	10%
310C: Mentoring and Tutoring	10%
310D: Discussion Notebook	20%
310E: Nature of Science Position Paper	5%
310F: Teaching Philosophy Video/Blog	5%
310G: Media Project	5%
310H: Final Researched Paper	15%
<b>Total:</b>	<b>100%</b>

The course grade will be determined on the percentage of total score points earned according to the following schedule:

$A \geq 90\%$	$80\% \leq B < 90\%$	$70\% \leq C < 80\%$	$60\% \leq D < 70\%$	$F < 60\%$
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### **Assignments and Specific Criteria:**

#### **310A: Participation in class discussions and activities**

Each week we will have discussion about the assigned readings and often an inclass activity or two to help promote thoughtful reflection and learning of the topic. Students are graded on this simply as (0 – not in class, 1 – at class but not talking and listening attentively and/or late to class, 2 – participating but obviously not prepared to discuss the material and/or leading the group off topic too often, 3- participating and contributing at a high level. E.g. Listening to others comments and answering questions or talking off them in a relevant manner, bringing interesting questions and answers to the table for discussion about the read material.)

### **310B: Leading in Class Discussion**

Each student will have at least two opportunities over the course of the semester to lead the discussion that week. They will be rated by their peers and myself on how well they did. Leaders will be chosen randomly as a way to assess student preparation in general. (Think of it like a pop quiz.)

### **310C: Study group Mentoring and Tutoring**

Students must independently complete 10 hours of either free or paid tutoring. They must tutor at least 3 different students and provide their name and contact info so that I can check that they did actually tutor these students. At least 2 of these 10 hours need to be either single one on one or group tutoring, i.e. if you usually tutor in a group you must do 2 hours one to one. Students must write a 1 page reflection for **each session** and submit it **no later than 1 week after** the tutoring has occurred. The earlier in the semester this is completed the better!

### **310D: Discussion Notebook**

Your notebook should be updated weekly by 12pm (noon) Wednesday via the file drop in reggienet. A weekly grade - half on completion of reading notes (either electronic or scanned copy of your writing- must be easily legible if you do not type it) and half on completion of the ideas/questions cards which must show deep reflection to get full credit. Students may resubmit ideas/questions following a class for more points in this category if full credit was not received. These resubmissions will be expected to be at a higher level because we will have already discussed the topic. Resubmissions should be submitted by the following week via reggienet and clearly labeled as such.

### **310E: Nature of Science Position Paper**

The first month or so of the semester we will be doing several readings and activities around the nature of science, science epistemology, and science literacy. At the end of this project, each student will submit a professional level paper on their position on these three things and how they interact with each other and with our roles as science teachers.

### **310F: Teaching Philosophy Video/Blog**

Each student will create a video or written blog post which outlines and supports their teaching philosophy. This project will go through a few iterations and critiques before a final creation is

made. More information on the exact break down of grades on this project and a rubric for grading will be provided closer to the activity.

### **310G: Media Project: Science in Popular Literature and Media**

Students will analyze a piece of science in the media (a book, a podcast, tv show, movie, song, etc. – again checking with me that their choice is acceptable). They will present the accuracy of the science, how it is perceived by the public, and how the media could have improved the presentation of the science to make this perception more correct. Students will be graded on their write up of their findings and on their presentation of their work. More information on the exact break down of grades on this project and a rubric for grading will be provided closer to the activity.

### **310H: Final Researched Paper**

Students will choose from a suggested list an education research topic and write a researched 7 page paper on this topic (Times 12 pt). They must have at least 15 cited published sources, i.e. not online article – find the *real* article behind the online pieces. PER Central has an excellent data base for finding articles and once you have 2-3 usually the cites for these articles give you other good ones! Each student will prepare and give an 8 minute talk about what he/she learned. The talk is 5% and paper 10%.

### **Academic Integrity:**

Students are expected to be **honest in all academic work**. A student's name on any in academic exercise shall be regarded as assurance that the work is the result of the student's own thought and study. Offenses involving academic dishonesty include, but are not limited to the following: cheating, computer dishonesty, plagiarism, grade falsification, and collusion.

### **Disposition Concerns:**

The College of Education, in an effort to ensure top quality graduates, provides faculty members and interested others with the opportunity to provide input into the teacher preparation process. One of these inputs is in the area of disposition concerns. Education faculty, in particular, are encouraged to bring to attention of CECP any significant problems associated with the following major areas. If three or more filed dispositions concerns have not been resolved, the teacher candidate will be blocked from advancing in Professional Studies.

- *Collaboration Issues:* The ability to work together, especially in a joint intellectual effort.
- *Honesty/Integrity:* The ability to demonstrate truthfulness to oneself and to others; demonstrate moral excellence and trustworthiness.
- *Respect:* The ability to honor, value, and demonstrate consideration and regard for oneself and others.
- *Reverence for Learning:* Respect and seriousness of intent to acquire knowledge.
- *Emotional Maturity:* The ability to adjust one's emotional state to suitable level of intensity in order to remain engaged with one's surroundings.
- *Reflection:* The ability to review, analyze, and evaluate the success of past decisions in an effort to make better decisions in the future.

- *Flexibility*: The willingness to accept and adapt to change.
- *Responsibility*: The ability to act independently, demonstrating accountability, reliability and sound judgment.