

PHY 5___: Formative Assessment in Physics I

Seattle Pacific University

Dates: Tuesday 10/20/2009	Monday 1/25/2010	Tuesday 4/13/2010
Wednesday 11/18/2009	Tuesday 2/9/2010	Wednesday 4/28/2010
Thursday 12/3/2009	Wednesday 2/24/2010	Monday 5/10/2010
Monday 12/14/2009	Thursday 3/11/2010	Wednesday 5/26/2010
Thursday 1/14/2010	Monday 3/22/2010	Tuesday 6/8/2010

Time: 5:30 PM – 8:00 PM

Instructors: Eleanor Close, Assistant Professor of Physics and Science Education, Seattle Pacific University (closee@spu.edu)

Hunter Close, Assistant Professor of Physics, Seattle Pacific University (hclose@spu.edu)

Lezlie DeWater, Resident Master Teacher, Seattle Pacific University Department of Physics and Seattle Public Schools (dewater@spu.edu)

Lane Seeley, Associate Professor of Physics, Seattle Pacific University (seelel@spu.edu)

Stamatis Vokos, Professor of Physics, Seattle Pacific University (vokos@spu.edu)

Location: Seattle Pacific University, Otto Miller Hall, room 138

Credits: 1-4 credits of PHY 5___, \$43 per credit.

CEU/Clock Hours: 0.5-3.0 units of CEU ____ (1 Continuing Education Unit = 10 clock hours); \$15 for 0.5, 1.0, or 1.5 CEU; \$30 for 2.0 or 2.5 CEU; \$45 for 3.0 CEU (see more information on CEU allocation below).

Credit/Clock Hour Details:

This course is offered for credit or for clock hours. The number of credits or clock hours that may be earned depends on attendance and participation.

Cohort members can earn 4 credits or 40 clock hours. Cohort members have committed to attend 12 or more sessions and complete 10 hours of application work in their own classrooms and/or working with colleagues in their schools.

Participants who are not cohort members can earn up to 3 credits or 30 clock hours (3.0 CEUs). You can earn one credit for every four sessions attended, or five clock hours (0.5 CEUs) for every two sessions attended. (Clock hours will only be awarded in increments of 5.)

Please also see the sections below on Assignments and Grades for more information on credit and clock hour options.

We have arranged for end-date registration for all options, so you do not need to know in advance how many sessions you will be able to attend; you can register in June for the appropriate number of credits or clock hours based on your participation during the year.

Course Description:

This course for teachers can be taken either as a standalone course or as part of a two-year, coherent, articulated professional development program.

This course will provide for the continuing development and application of ideas about energy instruction and formative assessment. Course activities will include presentations by instructors or special guests; whole-group discussions in which instructors and participants present and reflect on energy content and instructional strategies; and work in small groups.

Presentations by instructors and special guests may include:

- Introduction to the Diagnoser Tools (diagnoser.com) for formative assessment and targeted instructional intervention
- Presentations by instructors or guests on current studies of student learning about energy transfers and transformations, and/or the implementation and study of formative assessment strategies in K-12 classrooms
- Introduction to Science Curriculum Topic Study and associated resources for their study of science standards and student learning
- Presentations by guests whose work involves the study (and/or the implementation) of energy transfers and transformations
- Introduction to the Reformed Teaching Observation Protocol as a tool for reflection on constructivist classroom practice

Possible whole-group discussion topics include (but are not limited to):

- Reporting out of issues and findings from small group work
- Viewing and analyzing classroom video in order to practice informal assessment of student thinking
- Hearing from teachers who use Diagnoser Tools (diagnoser.com) regularly to explore strategies for using these tools and responding to the data that is generated
- Sharing examples of instructional strategies/lessons (e.g., discrepant events) and discussing implementation and assessment of student learning

Participants will form working groups around selected topics; working groups will receive support from the instructional team and will report regularly to other participants. Possible working group topics include (but are not limited to) the following:

- Energy working groups
 - Energy curriculum topic study, including energy diagrams and possibly focusing on chemical energy and/or photosynthesis
 - Integration of energy ideas within the context of specific district curricula
 - Review/development of formative assessment resources for energy, based on research into student ideas
- Instructional strategies and formative assessment working groups
 - Integration of instructional strategies in a specific curricular context (selected by the working group)
 - Study of strategies/resources for implementing and assessing group work
- Video analysis working groups
 - Formative assessment (diagnosing) of student ideas from classroom video
 - Planning of lessons/activities to be videotaped for analysis
- Content area working groups
 - Study of qualitative ideas about force and motion
 - Study of waves
 - Study of electromagnetism

This physics course is offered by Seattle Pacific University through the support of a National Science Foundation Discovery Research K-12 grant.

Stipend: *For cohort members:* \$800 for successful completion of the course.

For non-cohort participants: \$50 per session.

Learning Objectives:

Participants will:

- Increase skills in adapting instructional activities to identify and address student ideas
- Increase skills in implementing formative assessment strategies and responding to the results
- Enhance their understanding of energy concepts
- Identify and discuss examples of the flow of energy (transfers and transformations) in systems in the instructional materials they use with their pre-college students
- Explore student ideas about energy
- Explore and gain facility with instructional strategies that promote student understanding of energy

Instructional Goals for Course:

- Provide professional development that is consistent in content and delivery with standards and benchmarks in national science education documents
- Provide teachers with support in enhancing their own formative assessment practice
- Provide teachers with access to research on students' conceptions related to the topic of energy
- Be informed by and consistent with what we know about how people learn (including what it means to create learning communities that are learner-centered, knowledge-centered, and assessment-centered)

Curriculum: Course materials will be provided.

Assignments:

Participants taking the course for credits or for 40 clock hours will assemble a portfolio of work for the course. The number of portfolio elements assigned depends on the number of credits for which the participant registers.

Portfolio elements should document the thinking of individual participants as it develops over the academic year. This could include (but is not limited to) collaborative thinking taking place in working groups, evolving thinking about specific content ideas, and the application of ideas (or plans for applications) to classroom practice. Participants may select portfolio elements from examples available online. Participants may also propose portfolio elements based on class discussions, working group assignments, or other inspirations.

Portfolio elements will be reviewed by course instructors; participants may be asked to re-submit elements for completeness or clarity.

Attendance: The number of credits or clock hours that may be earned depend on attendance and participation (see details above). Cohort members have committed to attend 12 or more sessions.

Grades:

Cohort participants:

To receive 4 credits and a grade:

- Attend and actively participate in a minimum of 12 course sessions
- Complete a minimum of 16 portfolio elements documenting work completed outside of the 12 course meetings.

The course grade will be based on the number of complete and clear elements a participant includes in the portfolio (including resubmission of elements if requested). 16 or more elements will earn an A

for the participant, 12 or more will earn a B, 9 or more will earn a C. If a participant includes fewer than 9 elements in their portfolio they will receive a non-passing grade for the course.

Participants may also choose to register for 4 credits as pass/fail, instead of a grade.

To receive 40 clock hours:

- Attend and actively participate in a minimum of 12 course sessions
- Complete a minimum of 4 portfolio elements documenting application work completed outside of the 12 course meetings

Clock hours are credit/no-credit. To receive clock hours, participants must meet the criteria described above.

Non-cohort participants registering for credits:

Participants who are not cohort members can earn up to 3 credits. You can earn one credit for every four sessions attended. All participants registering for credits are assigned portfolio elements; the number of portfolio elements assigned depends on the number of credits for which the participant registers. Grades are based on the number of complete and clear portfolio elements submitted (including resubmission if requested). Participants may also choose to register for credits as pass/fail, instead of a grade; the cutoff for a passing grade is the same.

- For 3 credits: Attend and actively participate in a minimum of 12 course sessions
 - 12 or more elements will earn an A for the participant; 9 or more will earn a B; 6 or more will earn a C
 - Fewer than 6 elements results in a non-passing grade
- For 2 credits: Attend and actively participate in a minimum of 8 course sessions
 - 8 or more elements will earn an A for the participant, 6 or more will earn a B, 4 or more will earn a C
 - Fewer than 4 elements results in a non-passing grade
- For 1 credit: Attend and actively participate in a minimum of 4 course sessions
 - 4 or more elements will earn an A for the participant, 3 will earn a B, 2 will earn a C
 - Fewer than 2 elements results in a non-passing grade

Participants may also choose to register for credits as pass/fail, instead of for a grade; the cutoff for a pass is the same as described above.

Non-cohort participants registering for clock hours:

Clock hours are awarded based on attendance and active participation in course sessions. Participants may earn five clock hours (0.5 CEUs) for every two sessions attended. Clock hours will only be awarded in increments of 5.