



Course Syllabus
PH4710 – Methods of Teaching Physics
College of Science and Arts
Spring 2013

Instructor Information

Instructor: Michael R. Meyer, Director, Center for Teaching and Learning
Office Location: Van Pelt and Opie Library 219
Telephone: 906-487-2046
E-mail: mrmeier@mtu.edu
Office Hours: MWF 11:30-12:30 or by arrangement

Course Identification

Course Number: PH4710
Course Name: Methods of Teaching Physics
Course Location and Times: Tuesday 4-5 PM Fisher 132
Fridays 8-10 AM Fisher B020

Course Description/Overview

Hands-on exploration of physics education methods in classroom, laboratory, and tutoring environments. Students study highlights of physics education research and explore use of several tools and pedagogical techniques, including web-based homework systems, simulations, classroom feedback systems, and equipment for laboratories and lecture demonstrations.

Course Resources

Course Website(s)

- Canvas<<http://www.courses.mtu.edu>>

Required Course Text

- Five Easy Lessons: Strategies for Successful Physics Teaching by Randall D. Knight. ©2004 Pearson Education, Inc. , ISBN 0-8053-8702-1
- Other online readings

Course Fees

Lab/Course fee \$150.00

Course Learning Objectives

Students will, by the end of this course:

1. Observe, practice, and deliver a lesson using iclickers.
2. Observe the setup and maintenance of typical physics demonstrations and effectively deliver a lesson using a demonstration of their choice.
3. Become familiar with typical vendors of introductory physics lab and demonstration equipment.
4. Observe students and teaching assistants in a tutorial environment and reflect on effective tutorial practices.
5. Learn effective methods for using group whiteboards and deliver a lesson including this technology.
6. Create and implement a JITT “pre-flight” quiz in an LMS.
7. Become familiar with libraries of online physics resources, including videos and simulations. Build and deliver lessons based several of these resources.
8. Become familiar with several online homework systems, and author an effectively online homework assignment in Canvas.
9. Discuss effective use of online discussion boards in a physics context.
10. Gain exposure to professional organizations, pedagogical terminology, acronyms, highlighted physics education research, and other professional resources.
11. Effectively build and deliver a lesson in a 7-12 physics or physical science context using several of the above pedagogical techniques.

Grading Scheme

Grading System

<i>Letter Grade</i>	<i>Percentage</i>	<i>Grade points/credit</i>	<i>Rating</i>
A	90% & above	4.00	Excellent
AB	85% – 89%	3.50	Very good
B	80% – 84%	3.00	Good
BC	75% – 79%	2.50	Above average
C	70% – 74%	2.00	Average
CD	65% – 69%	1.50	Below average
D	60% - 64%	1.00	Inferior
F	59% and below	0.00	Failure
I	Incomplete; given only when a student is unable to complete a segment of the course because of circumstances beyond the student's control.		
X	Conditional, with no grade points per credit; given only when the student is at fault in failing to complete a minor segment of a course, but in the judgment of the instructor does not need to repeat the course. It must be made up by the close of the next semester or the grade becomes a failure (F). A (X) grade is computed into the grade point average as a (F) grade.		

Grading Policy

Grading will be out of 1000 points total, with a distribution described roughly as follows:

Pre-class reading responses	100
Class attendance/participation (see details in calendar)	160
Class projects and presentations (see details in calendar)	520
Final Project	220
Total Points	1000

Late Assignments

As you can see, full participation (including making presentations and evaluating those of your classmates) is essential to your success in PH4710. Failing to meet deadlines will affect not only your progress, but that of your classmates as well. Because of this, any request for extensions must occur as far as possible before the deadline in order for accommodation. Late work will not be accepted without prior notice and discussion of the impact on the rest of the class.

Course Policies

Students are expected to conduct themselves in a professional manner both in classroom and online settings. Feedback about classmates' work should be constructive in nature; it is my role to maintain a safe place for new educators to experiment with new pedagogies. Students' roles should therefore be collaborative and supportive as well.

Collaboration/Plagiarism Rules

We will be exploring many online resources this term, and you will be encouraged to use AND TO CITE them appropriately in an educational context. Collaboration with classmates and other educators is strongly encouraged, but presentations and other project work should be your own except as appropriately cited. As future educators, you should hold yourself to a model standard in terms of academic integrity.

University Policies

Student work products (exams, essays, projects, etc.) may be used for purposes of university, program, or course assessment. All work used for assessment purposes will not include any individual student identification.

Michigan Tech has standard policies on academic misconduct and complies with all federal and state laws and regulations regarding discrimination, including the Americans with Disabilities Act of 1990. For more information about reasonable accommodation for or equal access to education or services at Michigan Tech, please call the Dean of Students Office, at (906) 487- 2212 or go to <http://www.mtu.edu/provost/faculty-resources/syllabus-policies/>

Preliminary Course Schedule – See [Canvas](#) for current deadlines and information

Week 1 **WK 1 Total ____/60**

- ____/10 Pre-class reading response (Peer instruction and Clicker readings) (due 1:00 PM 1/15)
- ____/10 Class discussion participation (1/15)
- ____/40 Delivered clicker lesson in lab (1/18)

Week 2 **WK 2 Total ____/70**

- ____/10 Pre-class response #2 (Knight readings) (due 1:00 PM 1/22)
- ____/10 Observation of PH1140/PH1210/PH2100 or PH2200 (by arr – due 1/29)
- ____/10 Class discussion participation (1/22)
- ____/40 Delivery of existing demonstration in lab (1/25)

Week 3 **WK 3 Total ____/40**

- ____/10 Pre-class Response #3 (Knight readings) (due 1:00 1/25)
- ____/10 Class discussion/participation (1/25)
- ____/20 2 hours of demonstration shadowing (by arr no later than 2/12)

Week 4 **WK 4 Total ____/40**

- ____/40 – In class presentation of Vendor(2/5)

Week 5 **WK 5 Total ____/60**

- ____/10 Pre-class Response #4 (Knight readings) (due 1:00 2/12)
- ____/10 Class discussion/participation (2/12)
- ____/40 – In lab presentation of sensor/software (2/15)

Week 6**WK 6 Total ____/80**

____/10 – Pre-class Response #5 (High School Labs) (due 2/19 1:00 PM)

____/30 – Presentation: lab materials (RTP, Den of Inquiry, Physics by Inquiry, etc.) (2/15)

____/20 – Signed lab observation/learning center observation form (no later than 2/26 in class)

____/10 –Lab Observations posted (no later than 2/22)

____/10 Classmate responses posted (no later than 2/26, 1:00)

Week 7**WK 7 Total ____/60**

____/10 Pre-class response #6 (Whiteboarding, due 2/26 1:00 PM)

____/10 –In class participation in whiteboarding activities (2/26)

____/40 Delivered whiteboarding lesson in lab

Week 8**WK 8 Total ____/80**

____/10 – Pre-class response #7 (JITT readings) (Due 3/5 1:00 PM)

____/10 Class discussion/participation (3/5)

____/10 JITT quiz posted in Canvas (3/7, NOON)

____/10 Paper version of JITT quiz (3/8)

____/40 – JITT presentation and classmate observation (3/8)

Week 9**WK 9 Total ____/70**

____/30 Class discussion/presentation of sim site (3/19)

____/40 – Delivery of 15 minute lesson based around sim (3/22)

Week 10**WK 10 Total ____/60**

____/10 – Pre-class response #8 (Videos) (Due 3/26 1:00 PM)

____/10 Class discussion/participation (3/26)

____/40 – Delivery of 5-10 minute lesson based around video (3/29)

Week 11**WK 11 Total ____/60**

____/10 – Pre-class Response #9 (Due 4/2 1:00 PM)

____/10 Class discussion/participation (4/2)

____/40 Creation of online homework in Canvas (4/5)

____/10 - Reactions to classmates' online HW (Due 4/9, 1:00 PM)

Week 12**WK 12 Total ____/30**

____/10 – Pre-class Response #10 (Discussion Board links) (Due 4/9 1:00 PM)

____/10 Class discussion/participation (4/9)

____/10 Lab discussion/participation (4/12)

Week 13**WK 13 Total ____/70**

____/10 –Well prepared summary/plan for final lesson (4/16)

____/10 Class discussion/participation (4/16)

____/40 –Final lesson Run through in lab (4/19)

____/10 - Reactions to classmates' run-throughs (Done in Canvas, due 4/23)

Week 14/Finals week**WK 14/Finals week Total ____/240**

____/10 Pre-class Response #11 (Acronyms/terms) (Due 4/23 1:00 PM)

____/10 Class discussion/participation (4/23)

____/20 –Teacher pre-lesson meeting/plan (by arr)

____/100 – Teacher evaluation of final lesson delivery in local classroom (by arr)

____/100 – My evaluation of final lesson delivery in local classroom

Drop 1 participation grade (10 points)

Drop lowest pre-class response (10 points)

Overall Total ____/1000