

University of Houston-Clear Lake
PHYS 4372 – 01 Research Seminar (Spring 2018) Syllabus
7:00-9:50pm (M) in SSCB 1100

Quality Enhancement Plan (QEP)
Applied Critical Thinking for Lifelong Learning and Adaptability



Applied Critical Thinking Statement: This course has been authorized by UHCL as an Applied Critical Thinking (ACT) Course which means that in addition to learning about the specified course content, students will be engaged with some or all of the Elements of Thought and Universal Intellectual Standards of critical thinking. The objective of an ACT course is to develop the student's ability to become skilled at analysis and evaluation by applying a set of intellectual tools that may be effectively used across all disciplines (as well as to the student's personal life). Based on the Foundation for Critical Thinking model (<http://www.criticalthinking.org/>), critical thinking involves thinking for a *purpose*, asking *questions*, using *information*, applying *concepts*, drawing *inferences and conclusions*, identifying *assumptions*, anticipating *implications and consequences*, and recognizing *points of view*. The Universal Intellectual Standards that are applied to these Elements of Thought of critical thinking in order to develop Intellectual Traits include *clarity, accuracy, precision, relevance, depth, breadth, logic, significance, and fairness*.

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UHCL Emergency Hotline: 281 283-2221 (call this number to see if the university is closed for bad weather)

Textbook: None

Catalog Description: A study of current physics, space science and engineering research projects conducted in the format of a seminar class.

Course Description: The purpose of this course is to teach students the fundamentals of scientific communication while learning about how research is performed. This course incorporates the fundamentals of critical thinking as outlined below. It utilizes the Elements of Thought and Intellectual Standards defined within the context of recognized critical thinking standards. Students will attend presentations on different areas of physics and space science research as well as selected physics "career" talks and then write short (1-2 page) reports on each of these talks. The goal of these presentations is to teach students what does and does not work for successful scientific communications and to acquaint students with a broad range of research topics in physics and space science. At the end of the semester, each student will give an oral presentation on some area of interest within physics or space science.

How Critical Thinking is Present in this course:

The key learning outcomes of the UHCL applied critical thinking plan involves 4 C's. Of the four C's (curiosity, connections, creativity and communications), this course focuses on communications. The **Elements of Thought** (boldfaced in the statements below) and the **Intellectual Standards** (italicized in the statements below) are utilized in order to analyze the class presentations which form the basis of this course. Successful students in this course will analyze the **concepts, assumptions** and *significant problems* presented by the external speakers as well as utilize that *relevant information* in order to craft an effective presentation.

Student Learning Objectives: After completion of this course, students will be able to

- 1) Explain, with *clarity*, the basic **concepts** of how advanced scientific research is performed including any **assumptions** made by the presenter.
- 2) Clearly state *logical* elements of effective scientific communication in detail, based on the class presentations.
- 3) Identify *relevant* information within scientific presentations and identify the *significant problems* being approached.
- 4) Develop and present scientific **information** to a *relevant* audience.

Major Assignments:

Before each talk, students should investigate the topic and come to class prepared to ask at least 3 questions (SLO 3). Following each talk, Students will write a 1-2 page paper as described below (SLO 1, 2 and 3). At the end of the semester each student will present a 15-minute oral presentation on a physics or space science related topic of interest (SLO 4).

Each 1-2 page paper should:

- Summarize the **concepts** and **issues** being presented by the speaker as well as the **purpose** of his or her presentation
- Explain how the speaker's message is *relevant* to physics and/or space science
- Analyze the speaker's presentation style and **perspective**
- Explain from your **point of view** what makes this an effective or ineffective presentation
- Explain what **assumptions** the speaker makes if any throughout the talk

Assessment of Critical Thinking Activities

Each of the short papers (SLO 1,2 and 3) will be evaluated as to how well they satisfy the five criteria outlined above. The final oral report (SLO 4) will be evaluated using the attached oral communications rubric.

Assessment Criteria of Assignments

Assessment Activity	Assessment Outcome		
	Unacceptable	Acceptable	Excellent
Written Reports	0-80%	80-90%	90-100%
Oral Presentation	0-80%	80-90%	90-100%

Course Policies and Requirements

Grades: It is to your advantage to complete all assignments. Papers will be graded on a numeric system with 10 points possible for each assignment. Up to 2 points can be earned in each of the 5 paper elements outlined above. The final oral presentation will be evaluated using the attached

Oral Presentation Rubric at up to 44 points. The written reports and oral presentations will each count for 50% of your final grade.

Grading Scale used in this course:

A – 90-100%
 B – 80-90%
 C – 70-80%
 D – 60-70%
 F – Below 60%

Refined letter grade system, including “+” or “-“, will be used at the upper and lower ends of the grade boundaries.

Late Assignments: Two points will be deducted for late papers unless you have an emergency, such as illness, funeral, business trip, etc. Documentation (e.g., obituary, copy of ticket) should be attached to the late assignment. Late final presentations will not be accepted without documentation.

Attendance Policy: Students will maximize their learning experience by regularly attending class. You will be asked to sign an attendance roster at each class period. You get out of a course what you put into it.

Academic Honesty: All students should be aware of the university's policy on academic honesty: I will be honest in all my academic activities and will not tolerate dishonesty.

Compliance with the American Disabilities Act (ADA): If you are certified as disabled and entitled to accommodation under the ADA, section 503, please notify the instructor as soon as possible. If you are not currently certified and believe you may qualify, please contact the UHCL Health and Disability Services office at 281 283-2627.

Drop Rule Limitation: Students who entered college for the first time in Fall 2007 or later should be aware of the course drop limitation imposed by the Texas Legislature. Dropping this or any other course between the first day of class and the census date (February 2) for the semester/session does not affect your 6-drop rule count. Dropping a course between the census date and the last day to drop a class (March 30) for the semester/session will count as one of your 6 permitted drops. You should take this into consideration before dropping this or any other course. Visit www.uhcl.edu/records <<http://www.uhcl.edu/records>> for more information on the 6 drop rule and the census date information for the semester/session.

Use of Class Products in Assessment

The University of Houston–Clear Lake may use your work in this class to generate assessment data. Any works used will be used only for educational purposes.

Spring 2018 UHCL Physics and Space Science Seminar Series Monday's 7-9pm

Date	Speaker Name	Speaker's Job Title	Title or Topic of Presentation
29-Jan	Jancy McPhee	Executive Director, SciArt Exchange	Science...So What?

5-Feb	Peter Brown	Research Scientist at Texas A&M University/Mitchell Institute for Fundamental Physics & Astronomy	Measuring the Universe with Exploding Stars
12-Feb	Wes Kelly	Consultant Engineer, Triton Systems, LLC	A Partially Re-Usable Horizontal Take-off and Landing Launch Vehicle - A Continuing Case Study
19-Feb	Allan Treiman	Assoc. Director, LPI	Venus' Radar-Reflective Highlands: Ferroelectric and Semiconductor Materials
26-Feb	Jonathan Kay	Post-Doctoral Researcher, LPI	Folding on Iapetus
5-Mar	Heath Skinner	Assistant Professor of Radiation Oncology, The University of Texas MD Anderson Cancer Center	Biologic modifiers of radioresponse
19-Mar	Steve Fitzgerald	Multi-physics Modeling and Simulation Lead	Multiphysics Modeling of Hyrdocarbon Leaks on the Gulf of Mexico Floor
26-Mar	Shaun Stewart	Senior Development Engineer, Intuitive Machines	Fusing Physics and Video Game Technology to Build a Commercial Drilling Training Simulator
2-Apr	Tim Crain	Vice President of Research and Development, Intuitive Machines	Design of an Automated Re-entry Vehicle for Priority Sample Returns
9-Apr	Georgiana Kramer	Staff Scientist, LPI	The Weather on the Moon and the Mystery of the Swirls
16-Apr	Steven Koontz	ISS System Manager for Space Environments	Spacecraft Charging: Hazard Causes, Hazard Effects, Hazard Controls
23-Apr	Craig Walton	LaMont Aerospace/President	ISS Utilization and the Commercialization of Space as a Resource
30-Apr	Student Presentations		

SCE Oral Communication Rubric

Presenter Name _____ Reviewer _____ Total Score _____

Evaluation	4	3	2	1	Score
Bad Habits	Student exhibits two or fewer presentation bad habits such as pacing, stammering, hands in pockets, not engaging audience etc.	Student exhibits three or fewer presentation bad habits such as pacing, stammering, hands in pockets, not engaging audience etc.	Student exhibits four or fewer presentation bad habits such as pacing, stammering, hands in pockets, not engaging audience etc.	Student exhibits many presentation bad habits such as pacing, stammering, hands in pockets, not engaging audience etc.	
Mechanics	Presentation has no misspellings or grammatical errors.	Presentation has no more than two misspellings and/or grammatical errors.	Presentation has three misspellings and/or grammatical errors.	Student's presentation has four or more spelling errors and/or grammatical errors.	
Eye Contact	Student maintains eye contact with audience, seldom returning to notes.	Student maintains eye contact most of the time but frequently returns to notes.	Student occasionally uses eye contact, but still reads most of report.	Student reads all of report with no eye contact.	
Elocution	Student uses a clear voice and correct, precise pronunciation of terms so that all audience members can hear presentation.	Student's voice is clear. Student pronounces most words correctly. Most audience members can hear presentation.	Student's voice is low. Student incorrectly pronounces terms. Audience members have difficulty hearing presentation.	Student mumbles, incorrectly pronounces terms, and speaks too quietly for audience in the back to hear.	
Personal Appearance	Dressed and groomed appropriately.			Not dressed and groomed appropriately for such a presentation.	
Technical Content	Content is technically sound, exhibits appropriate research, and depth is appropriate.	Content is technically sound but could exhibit more research and depth.	Content is not strong, research and depth are lacking.	Content is trivial, research and depth are not demonstrated.	
Organization and logical flow	Student presents information in logical, interesting sequence which audience can follow.	Student presents information in logical sequence which audience can follow.	Audience has difficulty following presentation because of poor logical flow of information.	Audience cannot follow presentation because there is no logical flow of information.	
Response to Audience Questions	Student demonstrates full knowledge (more than required) by answering all class questions with explanations and elaboration.	Student is at ease with expected answers to all questions, but fails to elaborate.	Student is uncomfortable with information and able to answer only rudimentary questions.	Student does not have grasp of information; student cannot answer questions about subject.	
Meaningful Graphics and Visuals	Student's graphics and visuals explain and reinforce screen text and presentation.	Student's graphics and visuals relate to text and presentation.	Student occasionally uses graphics and visuals that rarely support text and presentation.	Student uses no graphics.	
Time Management	Student completely covers topic within the allocated time leaving an appropriate amount of time for questions	Student adequately covers topic within the allocated time leaving an appropriate amount of time for questions	Student covers topic with slight content omissions, or exceeds or underutilizes time limits.	Student inadequately covers topic and exceeds or underutilizes time limits.	
Presentation is appropriate for audiences in attendance and for objectives	Presentation communicates the presenters' objectives, and uses language and words/jargon/acronyms appropriate to the audience	Presentation communicates the presenter's objective, but does not use language and words/jargon/acronyms appropriate to the audience	Presentation does not communicate the presenter's objective, but uses language and words/jargon/acronyms appropriate to the audience	Presentation does not communicate the presenters' objectives, nor uses language or words/jargon/acronyms appropriate to the audience	