

Critical Thinking in Science

Summer 2018

9:30-11:00 AM Tuesday, GSBS Schissler Library (S3.8351)

Faculty:

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Course Goals:

Encourage a constructively critical approach to the evaluation of science research papers, proposals and other presentations.

Improve student awareness of the how to incorporate a critical approach in designing experiments.

Familiarize students with the peer review process and its importance.

Provide an opportunity for interactions between students that will increase awareness of differing viewpoints and priorities in the research community.

Format:

Class discussion of assigned reading and writing assignments. Some sessions will include lecture material from the instructors.

Grading: (Pass/Fail)

Because the success of this class depends on active student participation, the grading system is intended to encourage students to regularly contribute to discussions and to complete in-class exercises.

Preparation for and participation in class discussions (12 points total)

Participation in each class session is worth 1 point. Active participation requires that the student complete any pre-class assignments and meaningfully participate in discussions.

Written exercises and assignments (15 points total)

Five short written exercises (< 2 pages each) are planned for the class. The course instructors will grade each these exercises on a 0-3 pt scale. In general, full credit will be given in all cases where students complete these assignments in a thoughtful manner directed at the intended objective.

Final Grade: A passing grade requires that students earn at least 23 points total during the semester.

Missed Classes: Students who are unable to attend one class can earn credit for one missed session during the semester by contacting the instructor and satisfactorily completing a short written assignment. Credit will not be given for additional missed sessions.

Canvas Access: All registered students should regularly check the course website on Canvas where assignments will be posted.

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May 22 What is "Critical Thinking" - **Mattox**

May 29 Hypothesis, Bias and Dogma - **Mattox**
Reading assignment to be discussed in class

June 5 Data reproducibility – **Mattox**
Reading assignment to be discussed in class

June 12 Evaluating data and conclusions – **Broaddus**
Written assignment #1 due in class: Identifying assumptions

June 19 The peer review process - **Broaddus**
Reading for discussion at this class: Research papers from Dr. Broaddus

June 26 Discussion of student manuscript reviews – **Broaddus**
Written assignment #2 due in class: Review of assigned article

July 3 No Class – Independence Day

July 10 Origins and impact of a science controversy - **Krahe**
Reading Assignment to be discussed in class

July 17 Q&A with a scientific editor -**Cullinan/Mattox**

July 24 Identifying unanswered questions – **Mattox**

July 31 Project planning – **Mattox/Krahe**
Written Assignment #3 Due in Class: Outline a research project and identify one key experiment

Aug 7 Experimental design - **Mattox/Krahe**
Written Assignment#4 Due in class: Rationale and design of an experiment

Aug 14 Discussion and review of research projects – **Krahe**
Written assignment #5 due before class: Final proposal and assigned reviews.