PHY/AST 402: Astrophysics
Fall 2018

Dr. Thomas E. Oberst
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Office Hours: M 11 a.m. –12:30 p.m. & W 10 – 11:30 a.m. or by appointment

Meeting Times and Locations:
TR 2:00 p.m. – 3:30 p.m., HSC 294

Resources:

Course Overview:
This course mirrors a graduate school-style seminar. Approximately every two weeks, the instructor and students will select one peer-reviewed journal article from the astrophysical research literature. The instructor and students will read the article outside of class and meet in-class to discuss what they have read.

The discussion will follow the Socratic method, with the students leading and asking questions for the first half of the class, and the instructor leading and asking questions for the second half. For the students, this serves to correct and strengthen understanding of the article’s contents. For the instructor, this serves both as a teaching tool and as an opportunity to assess the degree to which the students have read and understood the article.

Following the discussion, the instructor will select several key points or questions that arose during the discussion, and assign them to the students for follow-up investigation. The students will present their findings at the beginning of the next class meeting. Finally, after finishing an article, the students are required to compose a written summary of the article’s key points.

Outcomes and Objectives:
Students are expected to gain a broad overview of the current state of astrophysics research, as well as a working knowledge of particular techniques and findings in several astrophysics research subfields. In the process, students will:

• Gain insight into the peer-review process for publishing research articles.
• Learn the tools and techniques for searching for, vetting, and retrieving research articles.
• Become familiar with the general style, layout and organization of research articles.
• Study the scientific content of research articles in several sub-specialties of astrophysics.
• Practice the skeptical analysis and critique of research findings.
• Become adept at summarizing the key take-away messages of research articles.
Letter Grade Assignments

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<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>93 – 100 %</td>
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<tr>
<td>A-</td>
<td>90 – 93</td>
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<td>B+</td>
<td>87 – 90</td>
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<td>B</td>
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<td>C+</td>
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<td>C</td>
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<td>D</td>
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Grade Allocation

Attendance & on-time completion of responses: 10%
Reading discussion & comprehension (oral): 25%
Responses to follow-up questions (oral): 25%
Summary of research articles (written): 30%
Department talk on one research article (oral): 10%

Late or missed components will be graded as zero percent, except in cases where a College-approved excuse is provided by the student in advance.

Attendance & on-time completion of responses
Students are expected to attend all scheduled classes, complete all assigned readings, and prepare all oral responses by the due dates. If a student is late for, or misses, any meetings or response deadlines, their grade will be pro-rated against the total number of such elements during the semester.

Reading discussion & comprehension
Students are expected to read in full the chapter assigned each week, invest time attempting to understand its general content, and arrive at the class meeting with prepared questions and discussion points pertaining to the chapter. Through the course of the discussion, the instructor will assess whether the student has read the chapter in full, has devoted adequate time in attempting to understand its content, and has prepared adequate questions and discussion points pertaining to the chapter. The student’s grade will be pro-rated for the completion and quality of execution of these tasks.

Responses to follow-up questions
Following the discussion, the instructor will select several points or questions that arose during the discussion, and assign them to the students for follow-up investigation. Students are expected to fully explore and analyze the questions and prepare oral responses to be presented at the beginning of the following week’s meeting. The student’s grade will be pro-rated for the completeness and correctness of their responses.

Summary of research articles
After a research article has been read in full, each student is required to write their own summary of the article. This provides the student with an opportunity to take a step back, consider all the pieces of information discussed, and assemble them into a smooth narrative that makes logical sense to them individually. The summary should touch upon the key steps in the research and the most important take-away messages and findings, but leave out minutia.
Aim for 1000 words, but only as a rough guideline. Some articles may be summarizable with less, while others may need more.

**Department talk**
Each student is required to present one research article via a public talk, for example as part of the Physics Department’s weekly lunch talk series, at a date and time provided by the instructor. The presentation should include appropriate visual aids (e.g. PowerPoint slides, a demonstration, etc.) and follow best practices for public speaking. The technical level should be adjusted to maintain the attention of freshman physics majors, while at the same time not glossing over complexities of the research. A draft must be submitted to the instructor one week in advance of the presentation to provide an opportunity for feedback and edits.

**Policies and Procedures:**
This course will follow the policies and procedures of the College as defined in the Westminster College *Student Handbook*. 