

AS 791: Special Topics in Astrophysics (Spring 2014)
Star & Planet Formation

Instructor:

Catherine Espaillat

CAS 404A

617-358-3441

cce@bu.edu

Email contact preferred.

Meeting time and location:

Tuesdays and Thursdays 2-3:30pm, CAS 502

Office hours:

Tuesdays 1:30-2pm & 3:30-4pm, Thursdays 1-2pm, and Fridays 2-3pm.

Course description and objectives:

This course examines our current understanding of how stars and ultimately planets form. More specifically, we will cover molecular clouds, protostars, protoplanetary disks, and accretion. We will also review select topics in the field such as transitional disks and exoplanets. The goal of the course is to provide students with an overview of the field of star and planet formation and teach practical scientific skills. To hone students' discussion and critical reading skills, the course will be conducted predominantly in a seminar format, with students leading discussions on assigned readings. The class will also integrate skills such as paper writing, peer review, presentations, and collaboration. Note that the syllabus and the course outline may change based on class progress.

Pre-requisite:

This course is intended for advanced graduate students. Students wishing to enroll must have passed the Astronomy Department's comprehensive exam.

Textbook:

Accretion Processes in Star Formation (2nd Edition) by Lee Hartmann

Website:

We will be using BU Blackboard (learn.bu.edu). The instructor will post copies of all non-textbook readings here. Also, all assignments must be uploaded to Blackboard.

Grading:

35% Leading class discussions

30% Preparation & participation

35% Group research project

Leading class discussion:

Each student will be expected to lead 4 class discussions. The purpose of this is to expose you to the process of leading and stimulating scientific discussions amongst peers. Students will select their discussions on the first day of class from the course outline. The expectation is that the discussion leader will start the class with a 10-15 min summary of the readings aided by a 1 page handout. This handout must be uploaded by noon before class meets. Note that the discussion leader is responsible for printing this handout before class for all participants. The discussion leader is also responsible for starting the discussion for the day with interesting questions. Grades will be based on the degree to which the handout and summary identify and explain the main themes of the work as well as stimulating a critical discussion.

Preparation & Participation:

The class is based primarily on discussion. Thus, you are expected to do all assigned readings and to thoughtfully reflect on them in preparation to participate in class. The purpose of class participation is to get you comfortable with engaging the scientific literature and participating in critical scientific discussions. You are expected to write a summary paper for the day's reading along with at least two questions for class discussion. These are due by noon before class. The purpose of the summaries is to keep you on track with the readings and to get you thinking about questions to bring up during class. The summary and questions should be at least 1 page double-spaced with standard margins and 12 pt font. It should be posted to Blackboard as a pdf. Grading will be based on the degree to which the written summaries and questions as well as in-class discussions demonstrate a thorough and critical reading of the text. Note that discussion leaders do not have to submit a summary.

Group research project:

Students are expected to work in groups of two and carry out an original mini-research project. The instructor will provide project details in class. The purpose of this project is to acquaint you with collaboration, LaTeX, ApJ letter submissions, peer review, and, most importantly, expose you to real star formation research.

Here are some important deadlines:

- Feb 6: go to at least one office hour by this date (optional)
- Feb 20: 5-10 min report; handout due by noon
- Mar 20: introduction due by noon
- Apr 15: first full draft due at noon
- Apr 24: referee report due at noon
- May 7: final paper due at noon

Each group is strongly encouraged to schedule at least one appointment with the instructor early in the semester to discuss research progress. Groups will present a short 5-10 min oral report to the class on research progress using a handout that contains an abstract and figures with captions. The presentation will be followed by 15-20 min of class discussion. Groups will hand in the introduction and later the

first full draft of the paper (which should be done in LaTeX and follow the Astrophysical Journal Letter guidelines, but there is no limit to tables or figures). Students will then individually review the other two groups' drafts and provide feedback. Note that the instructor will provide guidelines for the peer review process later in the course. The groups will then revise their papers based on this feedback (addressing all points and providing a list of revisions, as done for refereed journals) and hand in the final paper. Grading of the handout, introduction, and first draft will be based on the degree to which they reflect satisfactory progress. The referee report will be graded based on thoroughness and critical feedback. Grading of the final draft will be based on the clarity and writing skills as well as the degree to which original, independent research was performed. Those who do truly exceptional work have the chance of becoming a co-author on a submitted paper.

Attendance & Late Policy:

Since this course is based largely on participation, it is important that students stay on track with the readings and project deadlines throughout. Therefore, no assignments will be accepted late. In addition, students who cannot do the discussion they initially signed up for must take the initiative to find another student who will agree to swap with them and inform the instructor of doing this within at least 24 hours before the start of class. Students who have to miss classes they are not leading due to research-related travel should email the instructor as soon as they know the classes they expect to miss. These students will not lose participation points for the missed classes, but are still expected to keep up with the readings and therefore upload a summary of the readings. The student should arrange an appropriate deadline to post these readings with the instructor.

Academic Integrity:

Use of work found in the literature must follow professional procedures to avoid plagiarism (e.g., proper citations of text, figures, data, and conclusions taken from other works). Students should also know and understand the provisions of the Academic Conduct Code. The instructor will refer cases of suspected misconduct to the Dean's Office.