Department of Astronomy
Harvard University

# Study Plan for First Year Graduate Students

Your Name: _____ Year: _____

Your Academic Advisor: _____

The purpose of this study plan is to aid you in planning your coursework for the first two years and to allow the department to assess your academic needs. The plan should be discussed with and approved by your Academic Advisor before September 8, when all advisors are required to log in and approve your Study Card for fall semester. It may be helpful to discuss your options with other graduate students or your mentor. The numbered questions contained here should be answered carefully, as they are the basis upon which your Advisor may make recommendations to you.

Your Study Plan is not strictly binding, but if you decide to change course selection in the Spring semester, you should discuss this with your Advisor before registration.

Please identify a primary field of interest (this will be added to your profile on the Department website but can be edited anytime):

## I. General Background Requirements

The Committee on Academic Studies reviews the transcripts you submitted with your application at its first meeting each October. This is supplemented by this information:

1. Astrophysics Inventory

Many students admitted to the Harvard Astronomy graduate program were physics majors in college, and it is difficult to assess their background in classical aspects of astronomy, especially their knowledge of astronomical terminology. First year students will participate in a self-assessment inventory and oral exam in the Fall semester to assist the committee in ensuring that you have sufficient understanding of the broad field generally. This inventory will cover the basic concepts/core of Astronomy and Astrophysics that students coming from Physics or other disciplines might not know (magnitude and coordinate systems, flux definitions, elementary galactic structure, cosmological principles, etc.).

More information is available here:
http://astronomy.fas.harvard.edu/placement-examination

2. Research Self-Assessment

A note regarding sufficient preparation to begin research work can be found here: http://astronomy.fas.harvard.edu/physics-background

In what areas do you think you may have deficiencies?

How would you propose to remedy such deficiencies?

3. Computer Programming

Although not a formal requirement, every student is expected to be familiar with computer programming, at least on an elementary level. Typical minimum level of proficiency is an ability to write a simple Python, IDL, MATLAB, FORTRAN or C program for performing arithmetic operations, sorting data or integrating simple equations.

Do you feel that you are familiar with programming at that level?

What is your programming experience so far?

If you feel that you need to learn programming, either on your own or by taking formal courses, how do you plan to accomplish this?

## II. Course and Teaching Requirements

The course requirements for your PhD program are described below and online here: http://astronomy.fas.harvard.edu/astrocourses

Candidates for a PhD in Astronomy and Astrophysics should complete one core course in astronomy, at least five electives in astronomy, at least one graduate physics course, and should participate every year in Journal Club. Details follow.

1. All students should complete and obtain a satisfactory grade (A or B) in:

- Astronomy 200: Radiative Astrophysics

2. In addition, students are expected to obtain a satisfactory grade (A or B) in at least five of the following graduate level electives offered by the Astronomy department:

- Astronomy 151: Astrophysical Fluid Dynamics
- Astronomy 189: Exoplanet Systems
- Astronomy 193: Noise and Data Analysis in Astrophysics
- Astronomy 201: Stellar and Planetary Astrophysics
- Astronomy 202a: Extragalactic/Cosmology I
- Astronomy 202b: Extragalactic/Cosmology II
- Astronomy 203: Interstellar Medium and Star Formation
- Astronomy 218: Radio Astronomy
- Astronomy 219: High Energy Astrophysics
- Astronomy 231: Optics for Astronomers
- Astronomy 251: Quantum Mechanics for Astrophysics
- Astronomy 253: Plasma Astrophysics

3. An additional graduate-level research course in physics or other related science is also required. Traditionally, this elective was a graduate-level physics course such as Quantum Mechanics or General Relativity. One or both of these courses are still encouraged for students pursuing research in theoretical astrophysics. Other graduate-level courses covering topics that would broaden your understanding of the field of astronomy that you wish to pursue are also acceptable. This course must be approved by the Director of Graduate Studies (John Johnson) via email.

4. A Practical Elective is as an option as one of your electives. This course can also be taken outside the department and focus in areas such as data analysis, computer science, or planetary science. The choice of this elective should be discussed with your Academic Advisor who will then send an email to the Department office indicating approval.

5. Every graduate student is required to register for and participate in Journal Club (Astronomy 301hf) each year.

6. All students, independent of their financial support, must teach at least two semesters as part of their educational requirements. First year students may **not** serve as TF's, unless they receive permission from their advisor. Students with an NSF scholarship are typically not allowed to teach during their first year, per NSF rules.

## III. Course and Teaching Plan

Please check or list below the courses you intend to take during your first two years (i.e., four semesters). Check research time (Astro 300 = 4 units each) as needed. You can write in courses from other departments. A full-time schedule generally consists of a minimum of at least 16 units made up of courses, research or teaching (entered as Time-T on your Study Card.)

| 2017 Fall | 2018 Spring | 2018 Fall | 2019 Spring |
|---|---|---|---|
| ☐ Astro 202a | X Astro 200 | ☐ Astro 201 | ☐ Astro 203 |
| ☐ Astro 218 | ☐ Astro 202b | ☐ Astro 189 | ☐ Astro 193 |
| | ☐ Astro 219 | ☐ Astro 251? | ☐ Astro 231 |
| | | | |
| | | | |
| | | | |
| | | | |
| X Astro 301h | X Astro 301h (2u) | X Astro 301h | X Astro 301h (2u) |
| | | ☐ Teach (4 units) | ☐ Teach (4 units) |
| ☐ Astro 300 (4u) | ☐ Astro 300 (4u) | ☐ Astro 300 (4u) | ☐ Astro 300 (4u) |
| ☐ Astro 300 | ☐ Astro 300 | ☐ Astro 300 | ☐ Astro 300 |

## IV. Research Project

Normally, students look for a research advisor and research project during their first year, and begin work on the project at the start of their second semester. Officially, a student must decide on their research advisor by the end of the spring semester and should forward the name of the advisor to the Department Office. The selected research advisor then becomes the student's academic advisor. More information about research projects is available here: http://astronomy.fas.harvard.edu/research-project.

Do you have any thoughts about what kind of project you might wish to pursue or with whom?

**V. Public Outreach Project**

This requirement of our PhD program is usually implemented later in your career here at Harvard. However, we list it here so that you can start thinking about what you might wish to do. Learn more here: http://astronomy.fas.harvard.edu/public-outreach-project

**Signatures**

_____ _____

Date Signature of Student

I have discussed this study plan with the student and I approve it.

_____ _____

Date Signature of Adviser

This signed form should be turned into Robb in (P-241) promptly. Paperclips rather than staples are HIGHLY appreciated.