

Department of Astronomy Study Plan for First Year Graduate Students

Name: _____ Date: _____

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 background and your academic needs. The plan should be discussed with and approved by your Academic Advisor, and should not be handed to the advisor routinely for his or her signature. It may be helpful to discuss your options with other graduate students. The questions contained here should be answered carefully, as they are the basis upon which the Director of Graduate Studies (DGS) and the Committee on Academic Studies (CAS) make recommendations to you. It is also helpful to consult the following web pages:

<http://astronomy.fas.harvard.edu/book/departmental-requirements-advanced>
<http://astronomy.fas.harvard.edu/book/placement-examination>
<http://astronomy.fas.harvard.edu/book/research-project>

Graduate Studies in Astronomy, the official compendium of departmental requirements, is available in the Department office.

The following Study Plan is not binding, but any change to it must be submitted to and approved by the CAS.

I. Please Identify your Primary Field of Interest:

II. General Background Requirements:

It is essential that the CAS be able to assess your undergraduate preparation and recommend to you the means of making up any deficiencies. Our goal is to assure that every student completes the preparation equivalent to that listed in

<http://astronomy.fas.harvard.edu/book/placement-examination>

by the end of the first year at the latest. Please list below equivalent courses taken (or the most advanced course taken in that field), with the name of the principal instructor and the title and author of the text used. Consult the descriptions of the courses in

<http://webdocs.registrar.fas.harvard.edu/courses/Physics.html>
<http://webdocs.registrar.fas.harvard.edu/courses/AppliedMathematics.html>

1. Mechanics (Physics 151)

Equivalent course taken at:

Taught by:

Text used:

2. Electromagnetic Theory (Physics 153)

Equivalent course taken at:

Taught by:

Text used:

3. Statistical Physics (Physics 181)

Equivalent course taken at:

Taught by:

Text used:

4. Quantum Mechanics (Physics 143a, 143b)

Equivalent course taken at:

Taught by:

Text used:

5. General Mathematics (Applied Mathematics 104, 105)

Equivalent course taken at:

Taught by:

Text used:

What are the areas in which you think you have deficiencies? List the fields, using a separate sheet if necessary.

How do you propose to remedy such deficiencies?

When do you expect to complete the general background requirements?

III. Course and Teaching Requirements

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 the Journal Club. Details follow.

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

- Astronomy 200 (formerly Astronomy 150): Radiative Astrophysics

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 201a: Stellar and Planetary Astrophysics
- Astronomy 201b: Interstellar Medium and Star Formation
- Astronomy 202a: Galaxies and Dynamics
- Astronomy 202b: Cosmology
- Astronomy 215hf: Topics in Contemporary Astrophysics
- Astronomy 218: Radio Astronomy
- Astronomy 219: High Energy Astrophysics
- Astronomy 231: Optics for Astronomers
- Astronomy 251: Quantum Mechanics for Astrophysics
- Astronomy 253: Plasma Astrophysics

One of the five astronomy electives may be replaced with a course of equivalent intellectual substance in applied mathematics, computer science, physics or planetary sciences at the discretion of the DGS. It is possible that you already have a sufficient preparation in the fields covered by those courses on the basis of your own study or courses taken elsewhere, and can satisfy the requirement by taking an oral examination with the instructor responsible for the course. You are strongly urged to make any arrangements before the start of the term in which such courses are offered. Please note that undergraduate level courses offered elsewhere seldom provide adequate preparation. List any courses that you plan to satisfy through oral exams, and note if you have made any arrangements to that effect.

B. Graduate Quantum Mechanics or General Relativity. All graduate students must pass (= an A or B grade for graduate students!) one of Physics 210, 251a, 251b or Astronomy 251. Other appropriate Physics courses may be substituted with the approval of the DGS.

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

D. Teaching: All students, independent of their financial support, must teach for at least two semesters as part of their educational requirements. First year students may **not** serve as TF's, unless they receive permission from both their advisor and the DGS.

IV. Course and Teaching Plan (Important – Be Sure to Answer in Full)

Please list below the courses you intend to take during your first two years (i.e., four semesters). Please also list teaching and research time as appropriate. List research time as Astronomy 300.

2014	2015	2015	2016
Fall	Spring	Fall	Spring

V. Astronomy Background

Many students admitted to the Harvard Astronomy graduate program were physics majors in college, and it is difficult to assess their backgrounds in classical aspects of astronomy, especially their knowledge of astronomical terminology. We require, therefore, that students pass the “Placement Examination”, see <http://astronomy.fas.harvard.edu/book/placement-examination>

This test 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.). Knowledge will be tested at the level of the textbooks of Shu and Carroll & Ostlie.

VI. 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 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? More specifically, 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, indicate how you plan to accomplish it:

VII. Research Project

Normally, students look for a research advisor and research project during their first semester, and begin work on the project at the start of their second semester. Officially, a student must decide on the advisor by the end of the fall semester and should forward the name of the advisor to the Department Office. The selected research advisor then becomes also the student's academic advisor. The student should submit a research project proposal, along with the names of the advisor and suggested members of the Research Exam Committee, to the CAS no later than May 1 of the spring semester of the first year. The project should be completed by the end of the spring semester of the second year. Please indicate how you plan to meet these deadlines.

VIII. Laboratory Experience

The faculty would like all graduate students to participate in some observational or experimental project before graduating. The details of this policy are not yet worked out. Please discuss how you might satisfy this requirement. Do you have any experimental/observational experience? Do you intend to take a laboratory course or participate in any experimental work while at Harvard?

IX. Signatures

Signature of Student

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

Date

Signature of Adviser