UNIVERSITY OF WASHINGTON ASTRONOMY MENTORING PROGRAM

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UW Astronomy Graduate Mentoring Program

Rationale: Graduate students have broad and varying needs throughout their graduate training. Given this, students should be able to draw from a variety of senior mentors to support their goals. Mentors can play multiple roles -- supporting intellectual development, collaborating on research, advising on managing issues that may impact progress -- but it is unlikely that any single mentor can successfully fill all of those needs, or that the same mentors will be the best fit at all times. Graduate students therefore should have access to a flexible and robust network of mentors to help them progress towards their PhD.

Likewise, graduate students can have broad and varying goals throughout their graduate training. Identifying those goals, making effective progress towards them, and identifying (then removing) obstacles can improve a student's well-being during graduate school while also reducing time to completion. When students feel certain about their direction and that they are moving towards their goals, they are less likely to feel frustrated, anxious, and/or sad. When mentors properly understand a student's goals, and their perceived obstacles, they can provide more appropriate and effective support. Unfortunately, when mentors and students do have differing perceptions of a student's goals, a student's progress, or a mentor's effectiveness, it can be difficult to have conversations about misunderstandings or concerns that could actually lead to improvements in a student's well-being. Many of these potential issues can be avoided by the combination of clear articulation of goals and concerns, and regular, structured mutual communication. Mutual reflection and feedback by students and their mentors can be effective ways to identify clear goals, to accurately assess progress, to identify obstacles, to come to a shared understanding, and to consider changes that could lead to increased success and well-being. Even students who have identified a clear direction and feel secure in their progress can benefit from reflection and feedback.

Outline of Program: In response to the above, the UW Astronomy department has designed a Graduate Mentoring Program to help students progress through the graduate program. The mentoring program has four main components:

- A flexible "mentoring team" of 3 people or more, to serve as resources and advocates
- A regularly updated Major Milestones tracking form
- An annual student-led "Individual Development Plan (IDP)", to help students and mentors come to a shared understanding of the student's goals and plans for the year

- An annual structured discussion of student progress, incorporating feedback from both the student and the advisor, to help reflect on the past year while setting the student up for a successful coming year
- A 1-2 page research plan, to allow the student, research advisor, and mentoring team to assess the feasibility and scope of the student's current research project.

We give further details of each of these on the pages below.

Mentoring "team"

Many students naturally develop effective informal mentoring relationships with their colleagues at UW and beyond. However, we believe it is better to have a formal mentoring team than to risk a student not having broad access to advice, support, and guidance. The choice of mentors should be driven by the student, and should be easily adjusted in response to a student's changing needs. Changes should be reported to the Graduate Program Coordinator (GPC). Having a formal mentoring team, however, should not preclude the student reaching out to any other individual, within or outside the department, at any level of seniority. With these principles in mind, the mentoring team is as follows:

- The default mentoring team should consist of 3 UW Astronomy department members: 3 faculty, or 2 faculty and 1 postdoc
- The student may choose to include an additional experienced fourth member from outside the Department if they desire outside expertise or perspective as part of the formal mentoring structure. The experienced fourth member should be post-doc level or higher in their career path.
- The choice of members is entirely up to the student, subject to a few guidelines
    - If the student has a primary research interest, at least one faculty member should be aligned with it, even if the student has not decided on a specific project or research advisor.
    - If the student has a primary research project, the project advisor should be on the team.

    - The Graduate Program Coordinator (GPC[1]) should stand in for a primary research interest or advisor if the student does not currently have one.
    - Outside of having at least one "science-aligned" member, the student is free to select any other team members they feel would be a good source of support, advocacy, or advice.
    - The student can change the composition of the mentoring team as needed, but preferably no more than 2 people should be changed in one year, to assure some degree of continuity.
    - First years will be have an initial mentoring team, constructed by the GPC after soliciting suggestions during the summer before students arrive. Students can make changes or suggest members at any time by contacting the GPC, as the students' interests and needs evolve. The GPC will balance student suggestions against the goal of equitably distributing mentoring duties among the faculty.
- The mentoring team will help guide students through the research qual, by helping to vet the project, by being a resource for discussing science and research tools, and by providing initial reviews of the research qual document before it is forwarded to the Research Qual Committee.
- For senior students, the mentoring team does not have to be the same as the general exam and/or thesis committee, both of which focus primarily on mentoring research. However, rather than having two separate committees with overlapping concerns operating simultaneously and independently, it may be most efficient to expand the mentoring team to also include the full research-focused committee, even if it involves expanding beyond the nominal 3 people. The external Graduate School Representative (GSR) would not need to be involved in the annual meetings, unless the student wanted them as an active mentor.
- The existence of a mentoring team should *never* preclude a student seeking out mentorship and/or sponsorship from any other individual or group. If anything, the mentoring team should help to broker and steer students towards other supportive relationships.
- The Astronomy Department's Graduate Program Coordinator (GPC) and Academic Counselor are always available to help students, independent of their mentoring team.

Meeting Schedule & Content

[1] http://grad.uw.edu/policies-procedures/graduate-school-memoranda/memo-4-the-graduate-program-coordinator/

The mentoring team is expected to have two formal meetings a year with the student -- once in the fall quarter and once in the spring. For incoming students, the first meeting can be delayed until winter quarter to leave time to select initial team members and/or move into a research project. In general, the fall/winter meetings are about establishing goals and reviewing the student's priorities in their IDP. The spring meetings are about discussing progress, reviewing the research plan, and revising any plans for the coming ~6 months. The Major Milestones tracking form should be updated and circulated to the mentoring team in advance of both annual meetings.

- For junior students in their first two years, the first meeting should discuss goals & plans for the academic year, and the second meeting goals & plans for the summer.
- For senior students who have largely completed their coursework, meetings should discuss goals & plans for any upcoming milestones (general, thesis, job applications, conferences, paper submission, etc).
- The above meeting topics are guidelines, not rules.
- The student has responsibility for setting up the meeting and updating the Major Milestones tracking form, and the Department Academic Counselor will keep track of who has met and will send out reminders.
- After each meeting, students and the mentoring committee should revise or amend any associated documents (IDP in spring, Annual Progress Forms & Research Plan in fall, milestone tracking form in both), to capture any ideas that came up in discussion.
- The final version of the forms should be shared with all meeting participants, and submitted to the Department's Academic Counselor and the GPC. Sensitive information can be redacted.
- Students are free to meet with their mentors individually, or in any permutation, whenever they want, outside of the biannual meetings.
- If students have something difficult to discuss, they should feel free to meet with a subset of the mentoring team in advance of the full meeting, or with the Graduate Program Coordinator, or the Department Academic Counselor. If the student needs advice about a serious issue they are not comfortable discussing within the Department, they may talk with the University Ombud (https://www.washington.edu/ombud/).
- The student may specify communication preferences for difficult topics, e.g. who of the mentors will "reach out" to broach a difficult topic, and what medium will be used for that communication. The mentor team will abide by the student's preferences.
- The content of any of the above meetings are to be held in confidence unless all attendees agree otherwise, or there is a safety issue (https://www.washington.edu/safecampus/).

Meeting Preparation & Follow-up

- Before both meetings, the student should update the Major Milestones Tracking form and circulate it to their mentoring team.
- Before the fall meeting, the student should set goals for the coming year, and record them in the "Individual Development Plan (IDP)", discussed below.
- Before the spring meeting, the student and their primary research advisor (or GPC) should reflect on the past year and fill out their respective sections of the Annual Student Progress form, discussed below.
- Before the spring meeting, the student and their primary research mentor should collaborate on a 1-2 page research plan outlining the next steps in their current research project and a plausible timeline, as discussed below. The research plan should be circulated to the mentoring team at least 3 days in advance of the meeting, to facilitate discussions of the scope and feasibility of the plan.
- The IDP and/or Annual Student Progress form do not need to be shared in advance of the meeting, but participants should expect to discuss their answers.
- If students want feedback or help with an issue that may require some research on the part of their mentors, they may wish to inform their mentoring team in advance of the meeting.

Tools for Structured Reflection on Goals and Progress

Reflection and feedback are most effective when done regularly, given that goals can change, that in the absence of information people can erroneously assume the worst, and that it is easiest to improve issues before they become significant obstacles. Supporting students towards their goals should involve input and discussion from both the student and senior mentors, since both play a role in a student's training and development. Engaging in reflection and feedback is not punitive -- it is about helping students get the most out of their time in graduate school.

Fall Goal Setting: The Individual Development Plan

The Individual Development Plan (IDP) is a widely used tool to help students identify and articulate specific, actionable goals for the coming year. The specific IDP used in the Department is purposely open-ended, to give the student flexibility in identifying their current goals in three areas -- academic, career, and personal development. By sharing the IDP with their mentors, students are in a better position to receive support and advice that aligns with their goals. Sharing the IDP can also be used to help shape goals collaboratively, when the student is uncertain about their current path. The IDP is best done near the beginning of the academic year, to help frame the activities of the coming year, but can be updated by the student at any time. The IDP does not need to be shared in advance of the meeting, though the student may consider doing so to help their mentors identify possible supports in advance of the meeting.

Spring Reflection: The Annual Student Progress Form

The Annual Student Progress Form is an opportunity for students and mentors to reflect upon and share feedback about the past year, and to discuss progress on goals identified in the IDP. The primary aim of the form is to shape productive, meaningful discussion between the student and mentoring team, by asking each to think through important topics in advance of the meeting. The form has four sections: (1) Progress towards Major Milestones, to track logistics of courses and requirements; (2) Student reflection on progress; (3) Advisor reflection on progress; (4) Research Plan (discussed below). The first two sections should be completed by the student. The third section should be completed by the research advisor or GPC, in consultation with the mentoring team and any instructors in classes or teaching supervisors.

Spring Goal Setting: Research Plan

Developing a detailed outline of the steps involved in a research project is valuable for (1) constraining project scope; (2) estimating timelines; (3) identifying steps with long lead-times or possible difficulties; (4) eliminating mismatches between project requirements and current resources/skills/knowledge; (5) providing clarity, context, and structure for students beginning a new project; and (6) getting early feedback from others. When embarking on a project, a research plan should be constructed jointly between a student and their advisor. For beginning students, the majority of the plan will likely be shaped by the advisor, but should involve student input and discussion. As students advance, they should take increasing ownership of developing the plan, with advisors taking on more of a consulting role. For students who are working on

their thesis, the research plan will be an updated version of the thesis plan submitted during their General Exam.

Students should recognize that it is typical for research to *not* go according to plan, and for major steps in the plan to lack an obvious "ready made" solution. Finding these solutions en route to one's science goal is much of what research is, and learning how to find options and test possible solutions is a skill students are expected to develop during graduate school, with increasing independence. Note that "independence" does not mean "never ask anyone to share expertise"; instead, it means taking ownership of the process of solving problems, even if other people play a role in finding the eventual solution.

- A written research plan should be created in advance of the Spring mentoring meeting and submitted to the mentoring team three days in advance.
- The plan should be revised to reflect input from the mentoring team.
- The plan can be revised and reconsidered at any point, however, in response to a significant shift in plan or advisor.
- If the plan is changed significantly, however, it may be useful to arrange for a meeting with some or all of the mentoring team to discuss the new direction.

Summary of Responsibilities

Student:

- Discuss the composition of the mentoring team with the Graduate Program Coordinator, and inform the GPC of any desired changes as soon as possible.
- Schedule the biannual meetings with their mentoring team. In the event of scheduling difficulties, students can request help from the GPC.
- Optionally, the student may want to schedule additional meetings in advance of major Department Major Milestones (research qual, general exam, etc).
- Update their Major Milestones tracking form and circulate it to their mentoring team in advance of the biannual meetings.
- Before the fall/winter meeting, engage in pre-year reflection to set the year's goals, via the IDP. While the IDP does not need to be submitted to the mentoring team beforehand, the student should be prepared to discuss it.

- Before the spring meeting, collaborate with their research advisor to create a written research plan, which should be submitted to the mentoring team three days before the spring meeting.
- Before the spring meeting, complete parts (1) and (2) of the Annual Student Progress Form, and prepare to discuss with the mentoring team
- After the fall/winter and spring meetings, update forms and/or research plan to reflect discussion at the meeting, and then circulate the final form to the mentoring team, Graduate Program Coordinator, and Department student advisor.

Research Advisor:

- Be available to help students construct goals in the fall, if desired by the student
- Develop research plan with the student, taking into account advice given in Section 4 of the Annual Student Progress form, which should be circulated to the mentoring team three days before the spring meeting.
- Complete "mentor reflection on progress" (Section 3) of the Annual Student Progress form prior to the spring meeting.
- Revise Section 3 of the ASPF after the meeting, and then circulate the final form to the student, the mentoring team, Graduate Program Coordinator, and Department student advisor.

Mentoring team:

- A source of support and advocacy for the student.
- Respect the confidentiality of the student, and the student's communication preferences.
- Meet for the biannual and other meetings.
- Critically examine research plan in advance of the spring meeting. For pre-Qual students, evaluate feasibility in timeline.
- Advise on Research Qual. Each committee member should provide at least a paragraph of comments on the Research Qual document soon after the student provides a research qual document, two months in advance in meeting. These comments are turned over to the Qual Committee.

Grad program coordinator (GPC)

- Before the fall quarter, meet with first and second year students individually to set up a course plan for the year
- Establish 1st year mentoring team, in collaboration with incoming students, keeping in mind the existing loads on individual faculty where possible.
- Check in with students annually about possible revisions of the mentoring team
- Read forms, keeping an eye on potential issues raised and potentially identifying any systemic issues that need to be addressed Department-wide. Report on general, anonymized findings to the Astronomy faculty twice a year.
- Check in with mentoring team and student to make sure that the system is working and that concerns are addressed
- Act as advisor for students that are not currently tied to a research group
- Interact with Department Academic Counselor on managing logistics

Department Academic Counselor

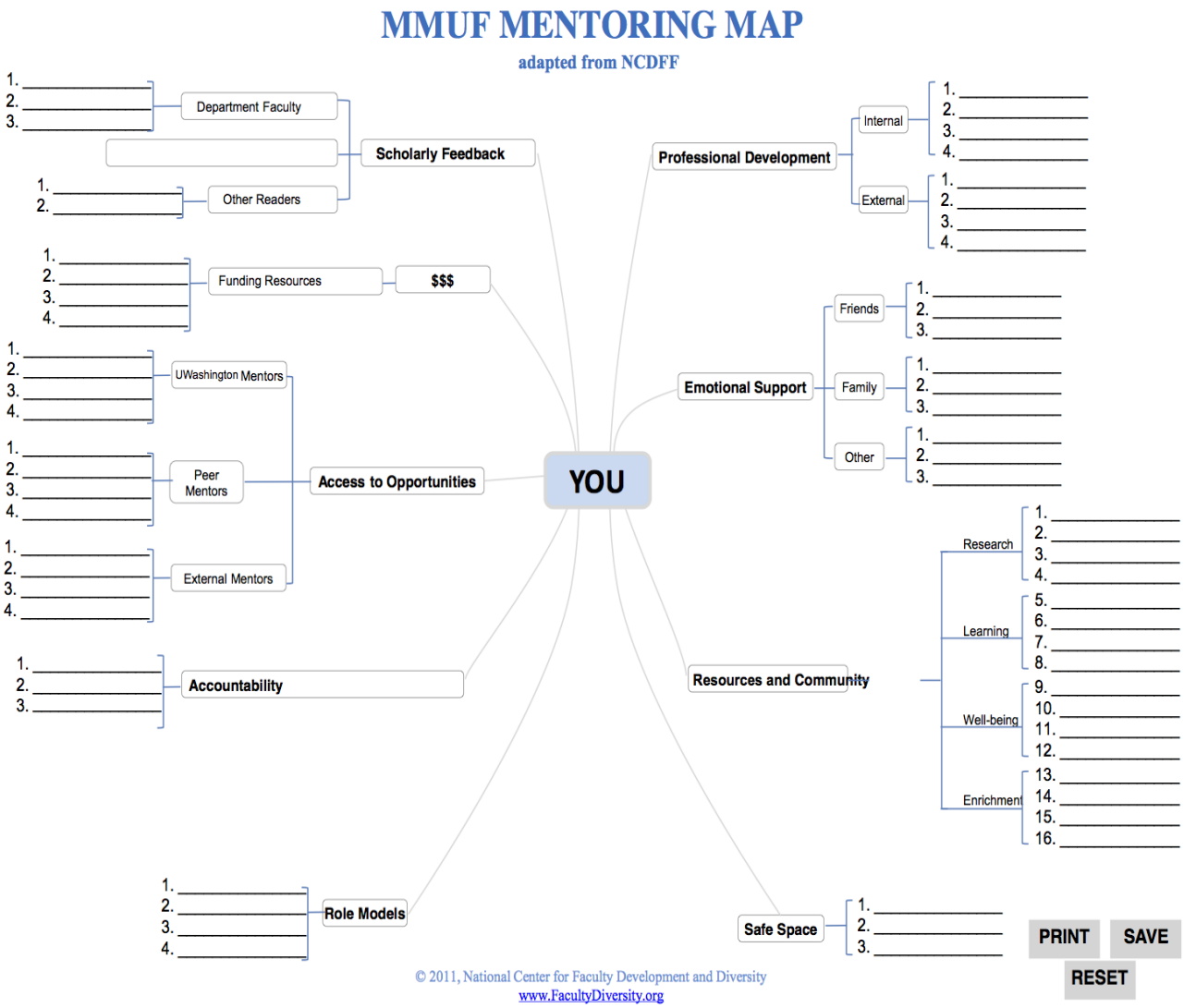
- Send out reminders for students to schedule meetings, and to verify meetings have taken place.
- Keep track of the membership of the Mentoring Team
- Collect forms for student's file and for sharing with GPC
- Check in with students who have not met within the expected timeline.
- Facilitate students' scheduling mentoring meetings, when needed.

Overview of Major Activities

<table>
<tr><th colspan="3">Fall Meeting</th></tr>
<tr><th>Purpose</th><th>Documents</th><th>Other Notes</th></tr>
<tr><td>Set or update goals for coming year</td><td>Individual Development Plan
Major Milestones
Course Planning (1st & 2nd years)</td><td>Thesis students may wish to review or update their research plan with their mentoring team</td></tr>
<tr><th colspan="3">Spring Meeting</th></tr>
<tr><th>Purpose</th><th>Documents</th><th>Other Notes</th></tr>
<tr><td>Reflect on past year
Set research plan for summer</td><td>Annual Student Progress Reflection
Major Milestones
Research Plan
Review Course Plan (1st & 2nd years)</td><td>Students may wish to update their IDP if they find their goals have changed significantly.</td></tr>
<tr><th colspan="3">Any Time</th></tr>
<tr><td colspan="3">Revise mentoring team members, in consultation with the GPC & research advisor (if any)
Request a meeting with mentoring team members, individually or as a group
Update and file a new IDP or research plan, in consultation with mentoring team
Consult with the Department Academic Counselor or GPC
Ask for help or advice from any member of the Department, the University, or beyond</td></tr>
<tr><th colspan="3">Incoming & First-Year Students</th></tr>
<tr><td colspan="3">During orientation, the GPC will meet with incoming students to help establish an initial mentoring team and course plan
First year students can choose to delay the standard fall meeting to early in the Winter quarter</td></tr>
</table>

Mentoring Map

The above formal structure is by no means the only way that students can find support during their time in graduate school. The following "mentoring map" provides a structure for students to think about cultivating a larger network of mentors. By filling out this map, students can identify potential gaps in their support network, and can rapidly identify sources of help when needed. This is based on the map found here: [faculty mentoring map]



Cumulative Progress towards Major Milestones

Department of Astronomy

This form is designed to help students and their mentors keep track of progress through various requirements and important career development activities.

The form should be updated twice yearly, in advance of the Fall/Winter and Spring meetings with the student's mentors. Copies should be given to the mentors in advance of the meeting, and final revised versions should be given to the Graduate Program Coordinator, and the Department's Academic Counselor after the meeting.

Typical progress through the graduate program includes:

- Classes (first 2 years, primarily)
- Research Qualifying Exam (typically by end of 3rd year, but end of 4th allowed)
- General Exam (typically within 1 year of Research Qual)
- Thesis Defense

During this period, students will also engage in experiences that will further a range of possible career goals, including:

- Teaching (3 quarters of TA'ing required before graduation)
- Writing papers
- Writing proposals
- Attending conferences
- Developing collaborations and mentoring relationships outside the university
- Outreach activities
- Service activities
- Training in any of the above

Student Information	
Name	
Date of last Fall/Winter IDP meeting	
Date of Spring annual progress meeting	
Current Year in Astronomy Program (*1st, 2nd, etc*)	
Primary Research Advisor *(if none yet, list fields of interest, or "undecided")*	
Other Degree/Certificate Programs (*i.e, Astrobiology, Data Science, STS, etc*)	
Next major milestone and estimated date, if known (*i.e. "Research Qual, Spring 2020", "General Exam, not yet scheduled but expected next year", "Graduation", etc*)	
Current mentoring team*	
Current supervisory committee members (*General Exam Committee or Thesis Committee*), if applicable	
Long term aspirations (*e.g., undecided, faculty at research university in Asia, faculty at teaching-focused college in US, data-scientist, national lab, astronaut, etc*)	

*****Mentoring team composition can be changed by the student through discussion with the GPC

Current and Past Coursework[2] (excluding 600 & 800, Journal Club, and Colloquia)				
Course Name & Number (And Department if not Astronomy)	Required for Program? If so, list which one.	Year Taken	Grade	Mastery achieved? (need 7 of 8)
Radiative Processes/Stellar Atmospheres	Astronomy			
Thermo-, Hydrodynamics & Stat Mech	Astronomy			
Stellar Interiors & Evolution	Astronomy			
Exoplanets & Planets	Astronomy			
Interstellar Medium	Astronomy			
Galactic Structure & Dynamics	Astronomy			
Cosmology	Astronomy			
Observing	Astronomy			
Completed Electives				
Anticipated Electives				

Number of 600 Research Credits: _____
Number of 800 Research Credits: _____

In addition to the UW Graduate School policies below, passing 7 of the 8 Astronomy core courses is required for a Masters. Three 3-credit graduate electives are required (in addition to core Astronomy courses) for a PhD, as is achieving mastery in 7 of the Astronomy core courses. The electives do not have to be in Astronomy. Graduate school policies can be found here: https://grad.uw.edu/policies-procedures/masters-degree-policies/masters-degree-requirements/

2

http://grad.uw.edu/policies-procedures/doctoral-degree-policies/doctoral-degree-requirements/

Research Interests and Progress			
Current scientific interests:			
Financial support over the past year (advisor, fellowship, TA, etc) Give % breakdown if from multiple sources	Summer		
	Fall		
	Winter		
	Spring		
Expected support next year?			
Names & affiliation of 3 possible letter writers, if known (for fellowships if 1st or 2nd year, jobs if 3rd or later)			
Scientific/technical development activities while at UW (conferences, trainings, collaborative visits, etc)			
Name/Description	Quarter(s)	Location	Title & type of any presentation given?
Proposals submitted while at UW, newest first			
Program & Type of proposal (i.e., observing, fellowship, etc)	PI?	Quarter submitted	Successful? If so, what was awarded?
Papers to date, newest first (Give title, authors, year, status, and link to arxiv or ADS)			

Teaching, Service, and Broader Engagement*			
UW Teaching Experience (3 quarters required before graduation)			
Course	Quarter & Year	On-line?	Student Evaluation ("Instructor's contribution to course")
Teaching/Outreach/Inclusion Development Activities, newest first (classes, workshops, class observations, etc)			
Name/Description	Quarter(s) & Year	Skills/Insights gained	
Outreach Activities, newest first			
Name/Description	Quarter(s) & Year	Population reached	
Department or University Service Activities, newest first (committees, organizing, advocacy, mentoring, etc)			
Name	Quarter(s) & Year	Description of responsibilities	

*Add additional lines as needed

Individual Development Plan

UW Department of Astronomy

(*to be completed by the student, in advance of fall/winter meeting with mentoring team*)

Setting goals can help you be more intentional about the experiences you have in your training, and can provide key steps to heading in the right direction *for you*. Articulating these goals can also allow your mentors to understand your priorities, so that they may better support your development.

The best goals are SMART: **specific, measurable, achievable (actionable), relevant, and timely**. They can also be aspirational, and move beyond merely a "to-do" list that becomes burdensome. Where do you see yourself heading? Who do you want to become? What experiences will help you get there?

1. At least every other year, do a self-assessment or inventory of your current skills, knowledge areas, talents, strengths, and passions. You do not need to share your results, but may want to use any insights gained to structure your goals.

Some existing tools to help with self-assessment are, for example:

i. AAAS tool (science focused but broadly applicable): http://myidp.sciencecareers.org[1]

ii. Visual DNA (capacities – "who am I" - and personality assessment): http://www.visualdna.com

2. After some self-reflection, identify areas that you want to develop further over the next year, keeping in mind your longer term goals.

Once you have a good handle on your skills and strengths, you can see where there are gaps between where you are and where you aspire to be. Are there classes, workshops, online tutorials, etc. that can help you grow your skill set in certain areas? Informational interviews or networking that can help you break into a career?

3. Briefly summarize your goals in the following form, including any ideas for supporting reaching those goals, and plausible timelines.

The form is broken broady into "Academic", "Career", and "Personal Development". Examples of possible themes and topics are given on the page after the form, but you are not limited to the provided options. You may add and subtract entries to match your current situation, being mindful that you should neither have a single large nebulous goal, nor have so many goals that you feel overwhelmed. Think about what you will see, do, or be if you accomplish a goal, or make progress toward it. How will you know you are "done"? If you notice it is hard to say what you would see or do or be at the end of your goal-experience, you need to reframe the goal to be more concrete and specific and

actionable. If you have difficulty articulating goals in an area, feel free to initially leave a section blank until after discussing the IDP with your mentoring team.

4. Discuss these goals with your mentoring team in your Fall or Winter meeting

Your mentors can help you create or refine a plan for progressing towards your goals, and can help brainstorm specific supports. *Do not feel the need to have more than one sentence to describe each goal*, though you may want to be more expansive in recording possible supports that you and your mentoring team identify. You do not have to disclose any goals that you are not comfortable revealing to your official mentors, but you should keep them in mind.

INDIVIDUAL DEVELOPMENT PLAN for (Trainee/Year)_____

GOAL* (<=1 sentence, listed in order of priority)	What do you need to help you accomplish this goal? Are there specific people or resources that would be valuable?	What is your timeline for this goal?
Academic Goals		
1.		
2.		
3.		
Career Goals		
1.		
2.		
3.		
Personal Development		
1.		
2.		
3.		

**For some guidance on goal setting themes and topics, please refer to the next page*. Do not be limited by the suggestions, however, and do not be afraid to be bold in your thinking.

Discussed with Mentoring team (date): _____

Revised and submitted to Mentors, Graduate Program Coordinator, & Department Student Advisor: (date):_____

Possible Themes and Topics for Goal Setting

The help with the challenge of setting goals, here are some ideas to help jumpstart your thinking. More specific is better, and if you find yourself with a large nebulous goal, try to identify smaller, "actionable" steps that support that larger goal. Do not be limited by the ideas below, however, if they are not good matches to what you perceive as your biggest priorities.

Academic

- What specific knowledge do you need to gain to accomplish your goals?
- Are there courses or trainings you would benefit from?
- Are there tutorials you would like to do with mentors or advisors?
- What specific skills (methods or techniques) do you need to acquire?
- Are there graduate school or lab courses that would help you learn these skills?
- Could working with other students, postdocs, or faculty help you attain these skills?
- Would collaborating with another group help you reach your goals?
- Would you like to gain more experience in teaching?
- Are there specific teaching opportunities you are seeking?
- Is there a formal or informal training that may help you feel more confident teaching?
- Do you plan on publishing any papers?
- What are the anticipated titles/topics of the manuscripts?
- What are the anticipated dates of submission?
- Are there resources or knowledge you need to complete your paper?
- Would you appreciate dedicated help in developing skills as a writer?
- Are you planning on submitting proposals for funding or other resources?
- Who are the sources of the funding and what type of award do you seek?
- Are there deadlines to be aware of?
- What are the next steps to get ready to submit?
- Have you identified individuals who can help you review your proposal before submission?

Career

- What is your overall career goal?
- Where do you see yourself working, and in what capacity, in 10 years? (long-term)
- Where do you see yourself working, and in what capacity, in 5 years (medium-term)
- What do you want to accomplish towards reaching your career goals in the next year (short-term)
- If you do not have a clear goal, what activities would help you identify one?
- Are there relationships with mentors, advisors, or faculty that you hope to cultivate?
- What steps can you take to make these connections?

- Are there letters of reference that you hope to obtain before you are on the job market? (3 is typical)
- Are there any professional development workshops or trainings that you hope to take?
- What are the topics? (e.g., leadership, management, collaboration, mentoring)
- What steps can you take towards networking and advertising your work?
- Attending conferences?
- Making useful contacts at other institutions?
- Visiting and potentially speaking at other institutions?
- Other professional opportunities?

Personal Development

- Are there organizational or time management skills that you would like to develop?
- Are there habits that you find interfering with your ability to succeed (e.g., not speaking up, hesitancy to take risks, difficulty finishing tasks, etc)?
- Are there supportive relationships and mentors that you would like to cultivate outside of your department?
- Are there work-life balance adjustments you would like to make?
- Are there resources to support your mental or physical health that you would like increased access to?

This list was informed by templates developed by the UW Graduate School, based on those developed by the UW Department of Medicine and Division of Pulmonary & Critical Care Medicine.

Annual Student Progress Reflection

Department of Astronomy

The Annual Student Progress Form is an opportunity for students and mentors to reflect upon and share feedback about the past year and progress on goals identified in the IDP. The primary goal of the form is to shape productive, meaningful discussion between the student and mentoring team, by asking each to think through important topics in advance of the annual spring meeting.

The form has three sections: (1) Student reflection on progress; (2) Mentor reflection on progress; and (3) Research Plan Assessment. The first section should be completed by the student; note that not all the

questions will be equally relevant to all students, depending on their current year. The first section does not have to be filled out from scratch every year, and instead can be copied and updated from previous versions. The second section should be completed by the student's primary research advisor/mentor (or the graduate program coordinator if the student does not yet have a well-defined research direction), in consultation with the mentoring team and any instructors in classes or teaching supervisors.

The Research Plan Assessment in the third section includes a few questions for the student and mentor, and a 1-2 page research plan. The latter should be generated collaboratively by the student and their primary research mentor, and should outline the next steps in their current research project and a plausible timeline. As students progress through graduate school, the balance of responsibility for crafting the research plan will gradually shift from the research mentor to the student. For students who have passed their general, the research plan will be an updated version of the thesis plan submitted at their general; updates can be provided as a short supplement, or annotations describing any significant changes. This section should be circulated to the mentoring team at least 3 days in advance of the meeting, to facilitate discussions of the scope and feasibility of the plan.

With the exception of the Research Plan Assessment, this form does *not* need to be shared or entirely completed in advance of the spring meeting, but participants should expect to discuss their answers and complete missing answers after the meeting. After the meeting, students and the mentoring committee should produce a completed final, revised version of the documents, capturing any ideas that came up in discussion. The final version of the forms should be shared with all meeting participants, and submitted to the Department's Academic Counselor and the Graduate Program Coordinator.

Note to the student: If you have something difficult to discuss, you should feel free to meet with a subset of your team in advance of the full meeting, or with the Graduate Program Coordinator or student advisor. If you need advice about a serious issue you are not comfortable discussing within the Department, you may talk with the University Ombud, or ask one of your mentors to help you find an outside advocate or mentor.

1. Student Self-Assessment

What went well for you this past year (e.g., accomplishments, areas of major growth, new skills, etc)?

In what ways did your progress align and/or diverge from the goals you identified in your Individual Development Plan earlier this year?

In what aspect of your professional development do you most want to make progress during the next year (e.g., scientific writing, technical programming skills, teaching, finishing projects, oral communication, literature knowledge, professional contacts, etc.)?

How would you describe your level of interest in your current research, in terms of both the scientific question and the research methods used? If your current interest level is low, are there changes to your research direction that you might find more engaging?

Are there other research directions and/or methodologies you would like to expand into?

Is there at least one postdoc, faculty member, or collaborator outside of your advisor that you could turn to for professional and/or personal advice? If no, would you like help in setting up an introduction?

If you were teaching this year and haven't discussed it above, what did you think went well? Were there challenging aspects that you'd like support on for the future?

If you were taking classes this year and haven't discussed it above, what did you think went well? Were there challenging aspects that you'd like support on for the future?

Are there changes to your advising that you would find helpful (i.e., changing the frequency of meetings, more structured feedback, more positive encouragement, more concrete goal setting, change in project, change in primary mentor)? You may choose to first discuss this separately with individuals in your mentoring committee, with the Grad Program Coordinator, the student advisor, or the Chair, if you are not initially comfortable discussing this with your advisor. For particularly serious concerns, you may wish to seek the help of the University Ombud.

What is the most significant obstacle (if any) that you are facing in reaching your goals, and are there specific resources, supports, or changes that might help reduce these obstacles?

If you are comfortable disclosing, is there anything you are facing that you think your advisor and/or mentoring committee should be aware of? (*Note: You are not obligated to answer this, but you may want to take advantage of this as an opportunity to start a conversation of ways that you could be better supported moving forward. For example, your mentoring team may have resources or connections in their network that could be of service, or, they can potentially insulate you from negative repercussions, say, by advocating for deadline adjustments or financial supports. You should also feel free to discuss this with mentors outside of your committee in advance of the spring meeting.*)

2. Advisor's Assessment

(To be filled out by the student's primary research advisor, or the Graduate Program Coordinator)

What do you feel were the student's most significant areas of growth during the past year?

What are some of the student's notable strengths?

What are concrete areas where you would like to encourage growth over the coming year?

Are there specific career-development milestones you would like to see the student to aim for in the coming year (taking the general exam, submitting first paper, writing a proposal, etc.)?

Are there steps you can take to support achieving the above milestones?

Are there other "sponsorship" activities that you can use to promote the student (collaborative visits, recommendations for conferences, supporting attending summer schools or trainings)?

What is your expectation for student funding for the next four academic quarters?

If the student has been taking classes during the past year, what holistic feedback do you have from the instructors about areas of success and for further growth?

If the student has TA'd this past year, what holistic feedback do you have from their instructional supervisors?

3. Research Plan Assessment

(To be filled out jointly by the student and advisor)

[Student & Advisor] Please attach a 1-2 page research plan for your current (or upcoming research project), outlining the major steps and plausible timelines. This plan should be developed jointly by the student and research advisor, discussed with the mentoring team, and then revised to reflect any input from the larger group. It will be most valuable to the student and mentoring committee if the plan breaks down the major steps into smaller substeps. For beginning students, or for more detailed project planning, it would be particularly valuable to include the following for each step:

- Possible approaches for completing the step
- Concerns/issues to be evaluated/verified at a given step before proceeding
- Identification of major decision points where subsequent analysis could change direction
- Needed high-level skills, and direction towards resources for acquiring those skills
- Needed resources (i.e., data sets, software, etc) and where they can be found
- Papers to read or to use as references for techniques or analysis strategies
- Useful terms to google or search in ADS
- People or collaborators to consult for expertise
- Clarity about whether a step is straightforward or will require investigation to solidify an approach

In addition to the above, please answer the following:

[Student] What is the status of any research milestones that had been set as targets during the previous year, if applicable? (Note: it is completely normal for plans to not go as expected, but it is also useful for everyone to understand why.)

[Student] Were there any new research directions that you embarked on during the past year?

[Mentoring team] Does the mentoring team have any specific feedback on the student and advisor's current plans for reaching the next milestone (e.g., research qual, general exam, thesis)?

Graduate Student Course Planning
Department of Astronomy

Coursework is an essential part of graduate student training. Some of the positive traits that coursework develops are:

- Common factual knowledge (essential for scientific literacy, capacity for a lifetime career, interacting with the broad astronomical community).
- Problem solving (needed for research)
- Rigor (essential for developing accuracy and thorough analysis)
- Career-development skills (e.g., writing proposals, programming, mathematical techniques, interpreting scientific literature)
- Synthesis of the interconnected nature of astronomy

In any graduate program, there is a tension between how comprehensive or demanding coursework is and how much of a student's work time can be devoted to other important activities (teaching, research, outreach). If coursework is limited, students can be underprepared to take on all the different roles that their future career might demand. If coursework is undemanding, then it could take many years for students to develop the needed skills, delaying progress. But, if coursework is too extensive and demanding, students cannot develop other needed skills, delaying their progress through graduate school. Within coursework itself, there is also a question of balancing coursework in Astronomy with coursework in other fields, which may be useful for specific thesis projects.

The Astronomy Department's graduate curriculum is designed around a number of principles that try to balance these various competing demands. These include:

- The majority of coursework should be completed within the first 2 years, to allow students time to complete the research qual by the end of their third year and rapidly progress towards thesis-directed research.
- A course load of 2 three-credit classes each academic quarter is a reasonable expectation in most circumstances. This load would allow students to comfortably take up to 12 three-credit classes during the first two academic year (7-8 required core courses in astronomy, and up to 5 electives).
- However, students may wish to occasionally take only 1 three-credit class in an individual quarter, and defer other, less-central electives to their third or fourth year.

- It is understood that a student's effort in coursework is likely to dominate over research during the academic quarters of the first two years, but it should not drive participation in research to zero when integrated over a entire quarter.
- As the PhD-granting department, the more than half of a student's coursework should be in Astronomy, such that graduates have the breadth of knowledge expected for Astronomy PhDs.
- The demands on required Astronomy coursework should not prohibit students with strongly interdisciplinary research interests from taking electives that match their likely trajectory.
- Students without compelling interdisciplinary research interests are expected to focus more of their elective coursework on those offered in Astronomy.
- Classes should be offered in an order that allows later classes in a year to build on knowledge from previous classes.

With these principles in mind, the Department's curriculum also has to manage some logistical realities:

- The university does not allow faculty to teach classes with fewer than 4 students.
- With our typically small entering graduate classes, we can only offer core curricula on a two year sequence.
- Graduate electives cannot be guaranteed to be offered every two years without advance knowledge that there is sufficient demand to enroll at least 4 students. Thus, if there is not consistent, broad engagement with Astronomy electives, these classes will not be able to be offered.
- Given the lower rate at which Astronomy electives can be offered, students need to be aware of how deferring some Astronomy electives to their third or fourth year could affect their ability to progress in their thesis.

To respond to all of the above goals and limitations, the Department advocates that all first and second year students engage in course planning with the Graduate Program Coordinator before the start of the fall quarter. If the students have a likely research advisor in mind, that advisor should also be consulted. The planning should take into account the requirements of the Astronomy Department:

- Taking at least 7 of 8 core courses, needed for a Masters
- Achieving Mastery in a course-completing project or exam for 7 of the 8 core courses, needed for a PhD

- Taking *at least* 3 additional three-credit graduate-level elective courses, needed for a PhD
- For the electives, a 400-level course can be substituted in fields where a grad-level class may be too advanced with just an astronomy background, such as in computer science, if approved by the student's faculty advisor.

In addition to the major 3 credit classes, there are smaller 1-2 credit classes that students are strongly encouraged to enroll in.

- Journal Club (credit/no credit) should be taken every academic quarter until passing the research qual, and then ~2 quarters a year thereafter. Students should present a paper at least once a year, except for students in their final year, who are exempt. First years are exempt from presenting during their first quarter.
- Colloquium (credit/no credit) should be taken every academic quarter, and should be attended if the student is in town, barring extraordinary circumstances.
- A Writing Seminar is offered every other year during the "stars & exoplanets" year, and most students would benefit from taking it at least once during their graduate career. The quarter varies, but will be in either Winter or Spring. The assignments in the class focus on supporting students as they work on writing for a current research project, and thus first and second years may choose to defer taking the class, although they are welcome to audit it.

Students involved in the Astrobiology or Astronomy Data Science Tracks will have additional scheduling concerns as they plan their coursework. Many of the offerings for these tracks are outside of the Astronomy Department's control, and many are not offered on a predictable schedule. As such, there may be quarters where students have to decide whether to take 3 significant courses, or delay one course option until their 3rd of 4th quarter; this decision should be made in consultation with the GPC and their subject research advisor. The attached figures attempt to summarize the current scheduling of courses associated with these two tracks; these are subject to change and students and the GPC will need to check on the actual course schedule for any given year. Some useful links for the course schedule in other departments are at:

- Statistics: https://www.stat.washington.edu/academics
- Computer Science: https://www.cs.washington.edu/education/time-sched
- Earth & Space Science: https://www.ess.washington.edu/education/courses/
- Physics: https://phys.washington.edu/courses

1. **Student Name: _____**
2. **Date Discussed with Graduate Program Coordinator: _____**
3. **Date Discussed with Possible Research Advisor: _____**
4. **Areas of research interest: _____**

Notional Course Plan for Regularly Scheduled Courses*			
Quarter	First Year	Second Year	Third Year
Fall			
Winter			
Spring			

*Excluding colloquium and Journal Club, which should be registered for every academic quarter

Desired Electives for Irregularly Offered Astronomy Courses			
Course Number & Name	Fulfills Data Science requirements?	Desired calendar year & quarter options for class to be offered	Personal Priority (low, medium, high)
Desired Electives for Irregularly Offered Courses in other Programs			
Course Number & Name	Department	Required for AB? For Data Science?	Priority (low, medium, high)

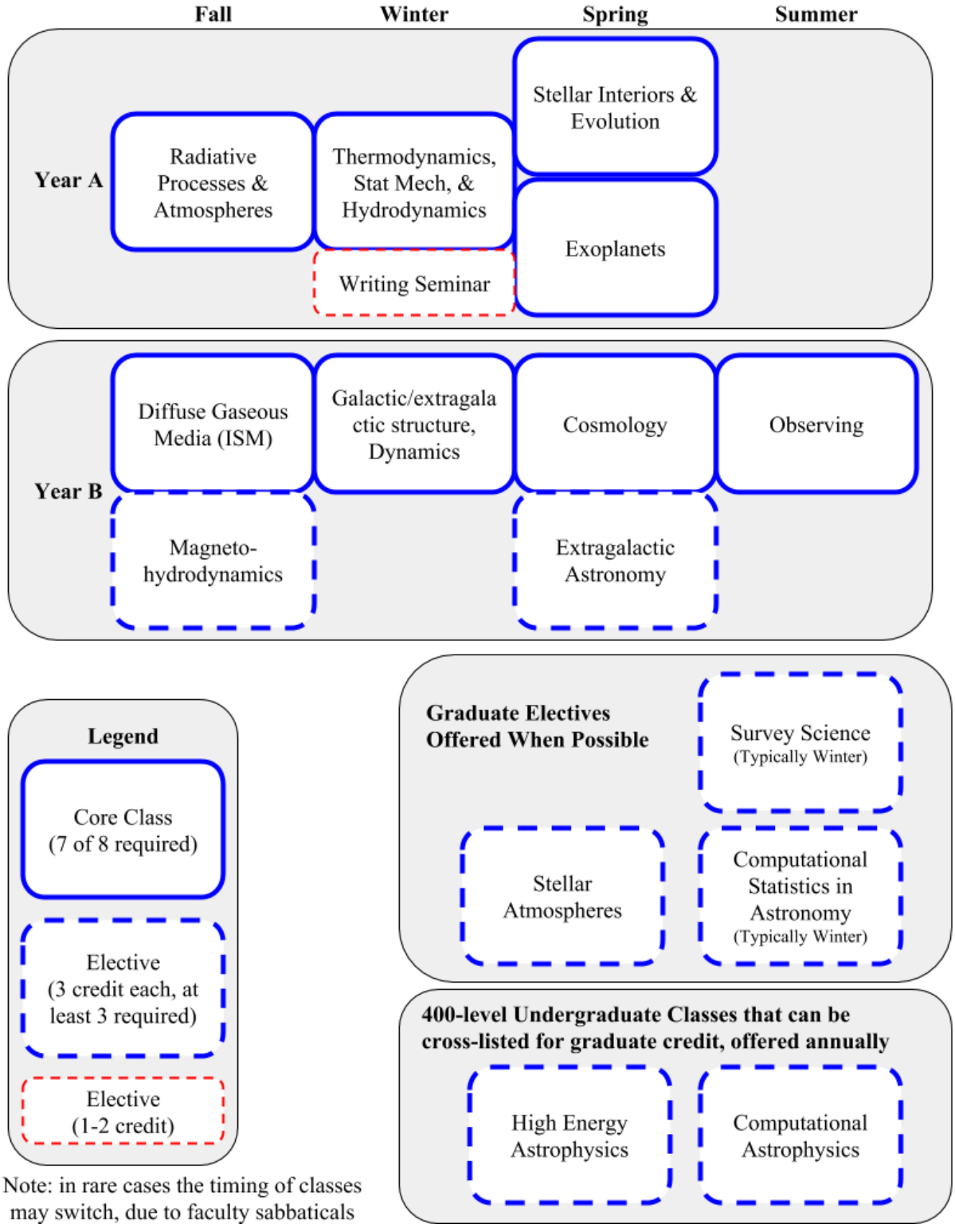
Recommended 3-Credit Astronomy Elective Tracks*

Interest	MHD	Stellar Atmo-spheres	Extra-galactic	Survey science	Compu-tational statistics	Compu-tational astrophysics	Other Depart-ments
Cosmology	Advised		Highly Advised			Highly Advised	Physics (GR/QFT)
Extragalactic	Advised	Highly Advised	Highly Advised	Advised	Advised		
High Energy, Compact Objects	Advised	Highly Advised	Advised			Highly Advised	Physics (GR, Nuclear)
Galaxy formation modeling	Highly Advised		Highly Advised			Highly Advised	
Stars	Advised	Highly Advised		Advised			
Data Science**				Advised	Advised	Advised	Stats, CSE courses
Planet formation modeling	Highly Advised				Advised	Highly Advised	
Astrobiology & Exoplanets		Advised	Advised		Advised		ESS, ATMS courses
Instru-mentation				Advised			CoE courses

*The recommended course sequences are chosen to be those that would optimally prepare a student to pursue a thesis in a given area. Students who have not identified a primary interest, or who wish to take different classes, should discuss their plans with their mentoring committee and/or the GPC.

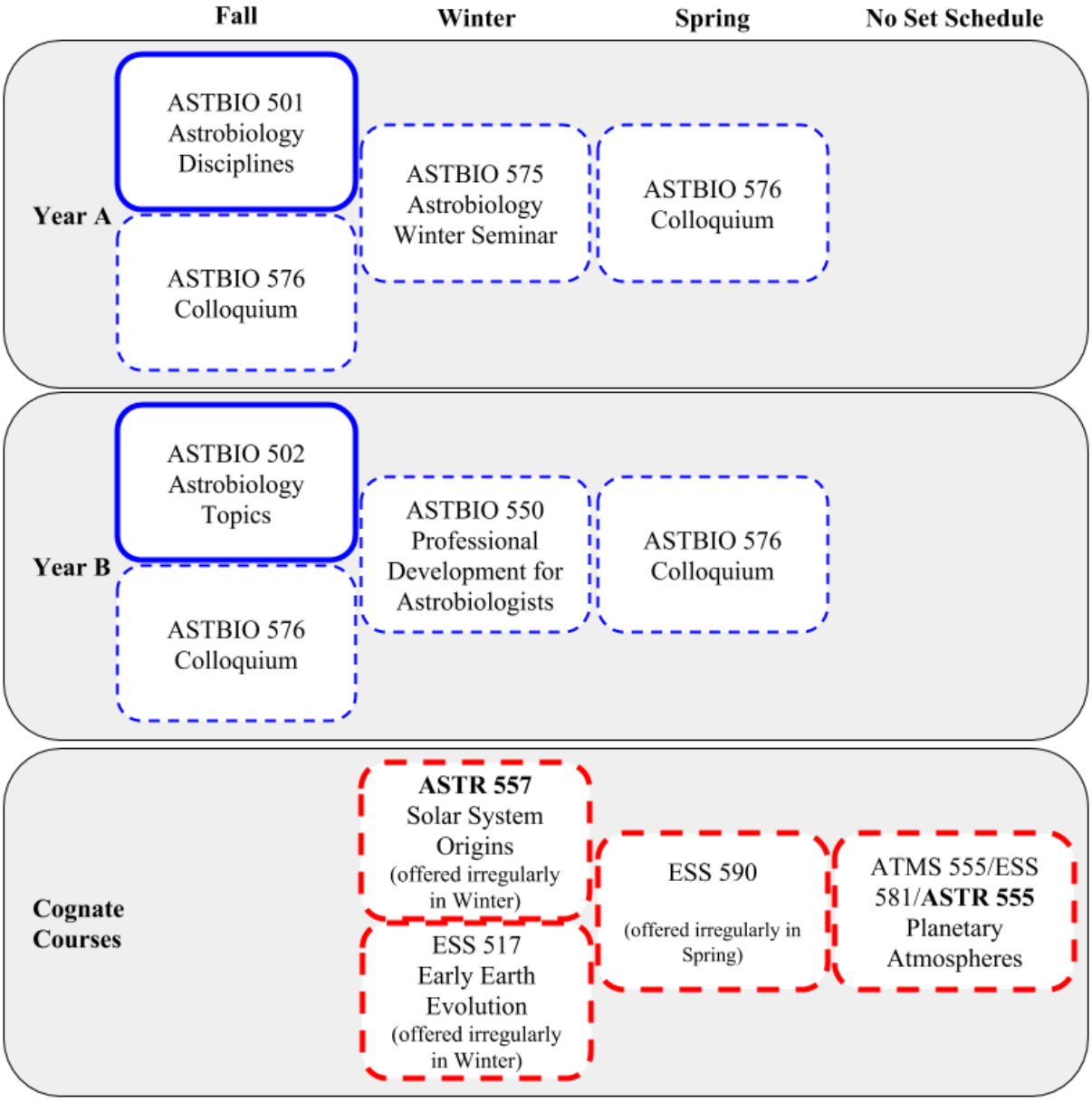
**The recommended courses count towards the Data Science Option (Data science option). However, students should also take courses to develop "domain science" expertise.

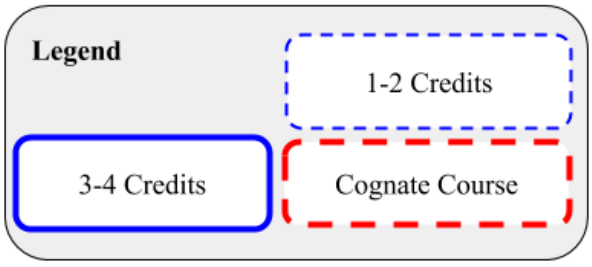
Astronomy Graduate Courses



Note: in rare cases the timing of classes may switch, due to faculty sabbaticals

Astrobiology Courses



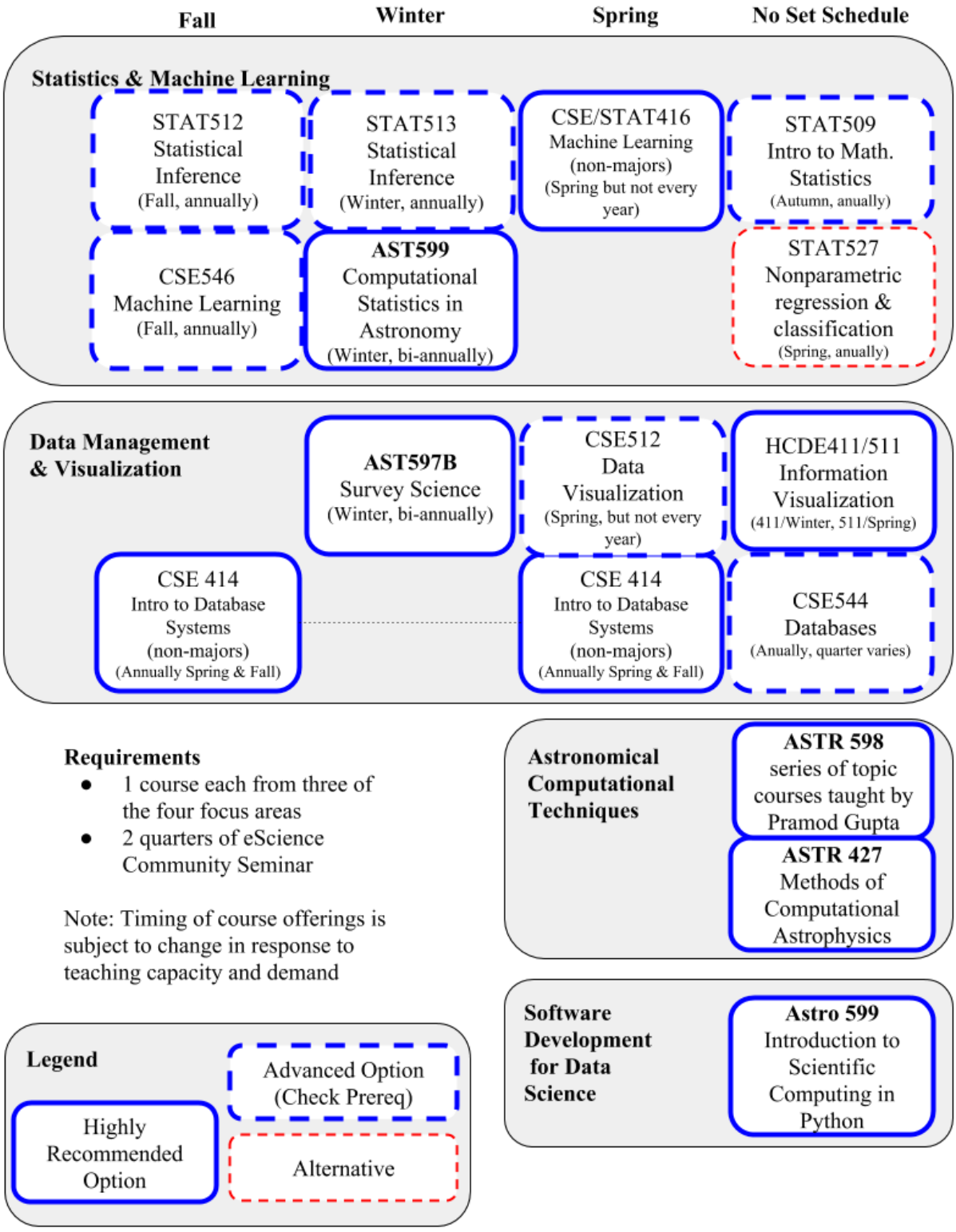


Additional Requirements

- 1 "cognate course" outside the home department
- 3 credit AB600 Research Rotation, completed in any quarter
- AB575 in Year 3 (1 credit)

Note: Timing of course offerings is subject to change in response to teaching capacity and demand

Astronomy Data Science Option Courses



Glossary

- **Mentoring Team:** A team of faculty and postdocs whose purpose is to provide advice, support and guidance to a graduate student. See the eponymous subsection in the above Overview.

- **Graduate Program Coordinator (GPC):** Senior member of the Astronomy graduate faculty who oversees the graduate program. The key responsibility of the GPC with respect to graduate students is "to advise, counsel and assist graduate students, or to arrange and verify that this service is rendered by another member of the Graduate Faculty. To ensure that special attention is given to newly admitted students and others with particular needs." See UW Graduate School Memo 4 for a more complete description. Tom Quinn is the current GPC.

- **Academic Counselor**: Staff member responsible for coordinating the necessary logistics for students going through the graduate program. Also a separate, non-faculty resource for the graduate students. This position is synonymous with the Graduate Program Advisor (GPA). Elisa Quintana is the current Academic Counselor.

- **Research Advisor:** Primary advisor for the graduate student's research project. For senior students this will usually be the chair of the student's Doctoral Supervisory Committee (and therefore a member of the Astronomy Graduate Faculty).

- **Individual Development Plan (IDP):** A tool to help articulate specific goals for the coming year.

- **Major Milestones Form:** A short form to help the student, mentoring team, Academic Counselor and GPC keep track of a student's progress through the graduate program.

- **Annual Student Progress Reflection:** opportunity to think about and discuss progress in the past year.

- **Research Plan**: 1-2 page description of research goals and tasks for the year.