APPLICATION FOR INDEPENDENT STUDY

Student's name (or students' names) and class year(s): Hexi Jin (DS23), Jeremy Choy (DS24)
Term and year: Term 6 2025
Course Title: Scientific Data Analysis in Python
Course Short Title: Scientific Data Analysis
Sponsor: Brian Hill
Pass/Fail, or graded: Graded
Credits (see section 5 of the Academic Policy): 2

1. Attach a Long Course Description (model provided in "Curriculum and Faculty Information"). If the course is expected to earn more than two credits per semester, please attach a detailed syllabus that explains the assignment of credit [this is spelled out in Section 3 below].

See the PDF at this URL:

https://docs.google.com/document/d/1HNgVvXerwORrqKYgGRCHOoRRMHnqlnYf1d5KpIYRRCc/edit?usp=sharing

2. What will the learning arrangement be (e.g., how many meetings with the sponsor, how many hours spent by the student(s) on project activities)?

We will meet twice a week on Mondays and Thursdays for 1.5 hours each session. Each session includes a coding exercise to reinforce key concepts and discussion over the reading material. Students are expected to spend an additional 3 hours per session on exercises and review.

3. How will the study be evaluated?

The study will be evaluated based on completion and quality of per-session coding exercises, engagement during meetings, and a final mini-project or reflective report that demonstrates understanding of the material. Emphasis will be placed on consistent participation, applied learning, and conceptual grasp rather than formal grading.

4. How will the proposed course contribute to the student's intellectual life at Deep Springs and to his long-term academic goals? How will it serve the sponsor's academic or professional interests? Why is this the best time and place for this course of study?

Hexi

This course feels like a natural continuation of the supernova observation project I did with Brian last year. That project had three phases—building techniques, collecting data, and analyzing it—but we only began the last part. This course gives me the tools and structured time to finally learn scientific data analysis in Python well enough that I could take that next step. Learning scientific Python and data science in a hands-on way will strengthen the skills I need both to make sense of real astronomical data and to bridge into more data-driven fields like economics or finance, which I'm now leaning toward. Deep Springs is the best place for this study because Brian is already familiar with my prior work and where I left off, so we can build directly on that foundation without needing to retrace earlier steps. It's also the last term of my time here, so it feels meaningful to continue studying something directly related to the high-quality data that Ethan and I collected.

Brian (sponsor)

Although I have cobbled together, through miscellaneous use of Python while solving a wide variety of scientific data analysis problems, I have never taken the time to see if there are theoretical approaches and associated Python software that might be widely used, but which I haven't encountered. A systematic survey will be helpful to me.

More importantly, we have data "in the can" from Spring of 2024 that still needs to be analyzed. While it is necessarily and unfortunately outside the scope of a seven-week course to fully develop the analysis software for this data, it will be valuable for both Hexi and I to review the available software, we can get started on it, and this will also be valuable to me as I explore and develop data analysis techniques for detection of transient astrophysical sources over the coming months.

Finally, I am also doing data analysis in Python for another project, and here again, I expect that a systematic study of relatively standard techniques will help with the unique features of that project.

Submitted:
Hexi Jin (student)
Jeremy Choy (auditing)
Brian Hill (sponsor)

Approved: _____ Academic Dean
_____ Curriculum Committee Chair