

# Data Science Syllabus Report

By Yihui Yap and Elaine Liu

## Introduction

To students, the syllabus serves as the first impression of a course. The document is available to all students - therefore, it serves as a resource to equalize information regarding the course, university policies, and student resources (Gin et al.). This is particularly helpful for students who come from different backgrounds, such as first-generation college students, first-year students, and transfer students. Thus, an inclusive, well-designed syllabus centered around accessibility can largely aid student engagement and impact overall student success (Stanford). This report will delve into how the UVA School of Data Science (SDS) Inclusive Syllabus template was constructed, the unique aspects of the template, and its projected impact on classrooms.

## Focus Group Explanation and Findings

The UVA School of Data Science conducted 2 focus group workshops in the Fall 2023 Semester, inviting students from lower-level Data Science classes (DS1001, DS1002) to share their personal experiences with syllabi from DS and non-DS classes. Students were provided with lunch and an incentive of a \$25 gift card to attend. Twelve (12) students participated in the first workshop and ten (10) participated in the second.

The first workshop focused on getting student feedback, asking questions such as “What do you use a syllabus for?” and “What would your ideal syllabus look like?”. The resulting feedback produced a wide range of responses. For instance, some students said that a syllabus using a slightly informal tone and a more personalized voice made them feel

more comfortable with the professor. Other students said that they preferred a direct and concise syllabus that articulates a simple overview of the class.

The second workshop focused on syllabus design, where students were asked to create a new syllabus using the existing DS1001 syllabus as a template. During the workshop, students removed, re-arranged, and added sections to create their ideal syllabus. For instance, students said they would delete the “Summary & Reviews” section of the course since they are already enrolled in the class. On the other hand, they decided to keep the calendar view of the course schedule because of the simple and effective format.

Using the student feedback gathered from the workshops and results from a literature review of syllabus design, we developed a syllabus template for undergraduate data science classes. However, it is important to note that some of the feedback from students was inconsistent, as each student has different preferences. This disconnect further emphasizes the need for a syllabus that is flexible, available in a variety of forms, and takes into account the needs of all students.

## What Makes this Syllabus Unique?

One distinguishing aspect of our Data Science Syllabus Template is that it will be presented through GitHub, an online software development platform used to store, track, and collaborate on software (Juviler). By leveraging GitHub as a platform, we aim to enhance accessibility and customization tailored to individual student preferences. Unlike a traditional PDF document, GitHub has a browser-based interface that allows students to navigate and interact with different sections of the syllabus. For instance, students could reveal or hide different sections, making the most significant parts of the syllabus more concise and comprehensible. Furthermore, GitHub has a wide array of optional functionalities, including text resizing options and alternative formats conducive to students with disabilities.

Another notable aspect of our template syllabus is the mandatory “Artificial Intelligence (AI) Policy” section. Given how relevant AI is to the content of data science courses, all SDS classes will be required to describe the scope and limit of using AI for coursework and assessments. The importance of generative AI’s impact on the classroom is highlighted in UVA’s Report of the Generative AI in Teaching and Learning Task Force. “In the spring of 2023, faculty and students grappled for the first time with how generative AI can shape what students learn, how they learn, and how their learning is assessed” (Heny and Pennok, 2). Many courses have differing opinions on whether generative AI should be allowed in the classroom, and students reported that “only 23% of their classes had clear AI statements this spring” (Heny and Pennok, 14). Giving students clear guidance on how generative AI can and cannot be used for learning would greatly reduce confusion and uncertainty. Additionally, fostering open communication helps all students maintain academic integrity and understand what is in violation of the Honor Code.

Another aspect our template syllabus highlights is clarity on limited opportunities to make up missed coursework. In school, missing classes occasionally due to illness or other circumstances will be inevitable. Thus, proactively designing a plan on how students will make up work will make it easier to address these challenges proactively (UPenn). For example, in the Fall 2023 semester, DS1001 offered a mass make-up session for any students who had missed lab sessions earlier in the semester. 35.7% of students who took the class attended this session, which indicates the demand for opportunities to make up work. Additionally, research shows that offering flexible attendance and submission policies helps show that instructors care about students - which in turn makes their “classroom a more comfortable place to learn and grow” (Chen et al, 9).

Additionally, we strongly encourage faculty to personalize the syllabus template. A Yale experiment concluded that the syllabus tone can have a “significant impact on how an instructor and course are perceived” (Harnish and Bridges, 8). Specifically, they found that a friendly syllabus tone helped students feel more at ease in the classroom, as professors seemed more approachable and compassionate. This also aligns with findings from our

focus group workshops where students stated that positive language in the syllabus evokes happy feelings, and ‘ruder’ remarks evoke angry emotions. One such example is instead of “If you need to contact me outside of class...”, use “I welcome you to contact me outside of class...” (Stanford). A present and positive voice from the instructor can help students feel more included in the classroom, resulting in a more rewarding educational experience for both instructors and students.

Lastly, in addition to our template syllabus, we also recommend standardizing Canvas pages for courses within the School of Data Science. UVA fully migrated to Canvas in Fall 2023, but there was no set standard for how professors should use Canvas. Thus, the Canvas pages for many courses “are not designed in an efficient or accessible way” (Taylor). One student commented that “it can be difficult to figure out where a certain professor posted something because every professor lays out Canvas differently” (UPenn Canvas). Not prioritizing considerations for technology use can greatly impact students with learning disabilities or related conditions. To better prioritize accessibility, one aspect of Canvas that professors could utilize is the Canvas Calendar view, a feature that brings together all assignments, quizzes, discussion due dates, and appointments. A more structured setup and standardized Canvas deliverables would greatly enhance the student experience.

## Impact in Classrooms and Overarching Goals

Aligned with the objectives in the SDS’s Inclusive Excellence Plan (UVA SDS), we hope a more inclusive syllabus will lead to higher student engagement and success. Specifically, an inclusive syllabus is the first step in developing a supportive and positive classroom environment where students feel welcome and respected. This environment helps develop a sense of belonging, which is essential in promoting motivation for learning (Dewsbury and Brame, 3). Research has also shown that an inclusive syllabus helps students understand faculty concerns and instructors understand student difficulties, making both sides more engaged in the classroom (Harnish et al.).

We hope that this syllabus will help students perceive their learning environment to be more inclusive and affirming, while also clearly communicating expectations for performance to contribute to student engagement (Kuh et al., 13). As a result, we anticipate students will feel more socially connected to the larger campus community and feel a stronger sense of academic belonging. Additionally, we hope the inclusive syllabus will highlight the significance of the “Responsible, Diverse, Accessible, and Open” goals in teaching in the School of Data Science (UVA Data Science Institute, 9).

## Conclusion

While there is no magic syllabus that will be able to satisfy each and every student's needs, making the course syllabus within the School of Data Science more inclusive is a good place to begin. Ultimately, we hope this project builds a foundation that highlights the need for supportive learning communities for students from all backgrounds. However, we also acknowledge that this is a learning process, and hope to continue improving this syllabus template with student feedback as it is implemented throughout the School of Data Science undergraduate programs.

## Works Cited

- Gin, Logan E., et al. "It's in the Syllabus ... or Is It? How Biology Syllabi Can Serve as Communication Tools for Creating Inclusive Classrooms at a Large-Enrollment Research Institution." *Advances in Physiology Education*, vol. 45, no. 2, June 2021, pp. 224–40, <https://doi.org/10.1152/advan.00119.2020>.
- "Building an Inclusive Syllabus." *Stanford Teaching Commons*, <https://teachingcommons.stanford.edu/teaching-guides/inclusive-teaching-guide/planning-inclusive-course/building-inclusive-syllabus>. Accessed 28 Mar. 2024.
- Juviler, Jamie. "What Is GitHub? (And What Is It Used For?)." *HubSpot*, 5 Jan. 2024, <https://blog.hubspot.com/website/what-is-github-used-for>. Accessed 28 Mar. 2024.
- Henry, Natasha, and Andrew Pennok. *Generative AI Has Arrived. What Does This Mean for Teaching and Learning at UVA?* June 2023. [https://provost.virginia.edu/sites/provost/files/Gen-AI%20in%20Teaching%20%26%20Learning%20final\\_508\\_0.pdf](https://provost.virginia.edu/sites/provost/files/Gen-AI%20in%20Teaching%20%26%20Learning%20final_508_0.pdf). Accessed 28 Mar. 2024.
- "Strategies to Help Students Stay on Track When They Must Miss Class." *UPenn Center for Excellence in Teaching, Learning and Innovation*, 1 Mar. 2022, <https://cetli.upenn.edu/resources/student-support/must-miss-class/>. Accessed 28 Mar. 2024.
- Chen, Jianfen, et al. "Reimagining Student-Centered Learning: Accessible and Inclusive Syllabus Design during and after the COVID-19 Pandemic." *Computers and Composition*, vol. 67, Mar. 2023, p. 102751, <https://doi.org/10.1016/j.compcom.2023.102751>.
- Harnish, Richard J., and K. Robert Bridges. "Effect of Syllabus Tone: Students' Perceptions of Instructor and Course." *Social Psychology of Education*, vol. 14, no. 3, Mar. 2011, pp. 319–30, <https://doi.org/10.1007/s11218-011-9152-4>.
- Taylor, Oden. "Disorganized Canvas Pages Impede Student Learning." *The Lumberjack*, 26 Sept. 2022,

<https://thelumberjack.org/2022/09/26/disorganized-canvas-pages-impede-student-learning/>. Accessed 28 Mar. 2024.

“What Students Want from Canvas Sites.” *UPenn Center for Excellence in Teaching, Learning and Innovation*, 24 Feb. 2022,

<https://cetli.upenn.edu/resources/tech/students-on-canvas/>. Accessed 28 Mar. 2024.

“Inclusive Excellence Plan — School of Data Science.” *UVA School of Data Science*,

<https://datascience.virginia.edu/pages/inclusive-excellence-plan>. Accessed 28 Mar. 2024.

Dewsbury, Bryan, and Cynthia J. Brame. “Inclusive Teaching.” *CBE Life Sciences Education*, vol. 18, no. 2, June 2019, p. fe2, <https://doi.org/10.1187/cbe.19-01-0021>.

Harnish, Richard J., et al. “Creating the Foundation for a Warm Classroom Climate.” *APS Observer*, vol. 24, Jan. 2011,

<https://www.psychologicalscience.org/observer/creating-the-foundation-for-a-warm-classroom-climate>

Kuh, George D., et al. *What Matters to Student Success: A Review of the Literature*. July 2006, [https://nces.ed.gov/npec/pdf/kuh\\_team\\_report.pdf](https://nces.ed.gov/npec/pdf/kuh_team_report.pdf)

“School of Data Science Phase II Faculty Senate Submission”. *UVA Data Science Institute*, 17 Apr. 2019,

<https://api.dsi.virginia.edu/sites/default/files/attachments/2019-09/schoolofdatascience-190429155451.pdf>