

BRISTOL COMMUNITY COLLEGE

5 Year + One CAS & Program Review Academic Affairs



Name of Program/Department:

Data Analytics

Degree:

Associates in science

Department Chair/Program Coordinator:

Jack Smith

Division:

Science, Technology, Engineering, Math
& Education

Division Dean:

Samantha Example

Year of Review:

2026-2027

Members of the Instructional Program Review Team
(i.e., internal and external stakeholders)

Start date of Review Process:

2021

End date of Review Process:

2027

Each program review is a critical self-study designed to analyze the program's achievement of its mission and goals and to make recommendations for the future.

SIGNATURES:

	Year 0	
Department Chair/Program Coordinator	Year 1	Date
Divisional Dean:	Academic Affairs Program Review	Date
Executive Dean:	Year 2	Date
	Year 3	
	Year 4	

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INTRODUCTION TO PROGRAM REVIEW (Standard language in all templates)

Reviews allow the College to assess the overall effectiveness of its programs and, as a result, these reviews provide a basis for modifying programs, establishing new programs, and allocating resources. Because Bristol is committed to building a narrative that is inclusive and comprehensive of the student experience, Academic Affairs, Student Support Services and Enrollment Management along with several operational & Employee Services engage in the review process.

The review is an ongoing process over the course of 6 years and builds on top of the previous year's deliverables. Reviews should support conclusions about programs using specific data on student success in learning outcomes and the effectiveness of programs within and beyond classroom learning. They are grounded in several best practices and frameworks. During the six-year period between years, departments conduct assessment projects which support SMART goals and yield actionable plans to improve practice. At the end of each year, departments summarize their findings using a template that focuses on the current year's deliverables and additional assessment initiatives outside the review process. This is the final step in the 5 year + 1 CAS & Program Review Cycle – the culminating program review report. The following template is designed to be both supportive on a structural level and open-ended in terms of the ways in which departments and programs are able to respond to the discipline-specific inquiries they make. The chair/coordinator, department and/or dean will discuss who will review the complete report. This should be addressed at the start of the semester and a timeline outlining the completion of the report and the review process should be established. For those with well-established advisory boards, this review along with the reviewer template should be used. For those who are redefining and/or establishing advisory boards, a discussion to determine representation of a small review committee (internal, external, mix of individuals), should be decided. The external review should be completed by August 1st of year 5 Program Review cycle.

There are three sections to the review: (1) Overview of Department or Program, (2) Analysis of Program Data, (3) Conclusions, Recommendations and Action Plan/s. Before completing this section, familiarize yourself with all sections to ensure brevity and avoid duplication.

OVERVIEW OF DEPARTMENT OR PROGRAM

Executive Summary of Review.

Please provide a brief overview of your findings and areas of need, including specific recommendations for future growth and institutional support for your department/program. Please be sure to highlight connections from your previous annual reports including, if applicable, any unexpected outcomes in its implementation). This information could frame the departments or program's presentation to President's Cabinet/PLT, or All Academic.

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[Sample]

Narrative Description of the Department or Program:

Please describe your department/program and include the following (the program mission statement, goals, and learning outcomes will follow this section-keep those separate): what does the program offer, what are common careers in the discipline, what makes the program unique/competitive, common trends, its relationship to other programs at the college, its relationship, where applicable, to external review and accreditation requirements, and any shifts in the implementation of priorities specified during the review cycle.

Program - Data Analytics

The Data Analytics program offers a robust academic foundation for students looking to develop expertise in collecting, organizing, analyzing, interpreting, and presenting data. Students gain the essential skills and knowledge needed to work with large data sets, make data-driven decisions, and effectively communicate insights, patterns, and relationships. The program integrates theoretical learning with hands-on experience, requiring students to apply their knowledge to real-world business and industry scenarios. Completion of a data analytics associates degree opens doors to various careers with the title of analyst and numerous other job titles that use analytical skills. The curriculum partners with several other departments sharing common subject matter and skill attainment. Courses within the business area and Arts & Humanities dictate strong critical thinking, ethical practices, and global perspectives. General Education courses that emphasize these competencies are intentionally chosen.

Data skills will be critical in the age of AI. Graduates with an associate degree in Data Analytics seek career paths in data analytics within business, government, health care, politics, sports management and much more. According to [NH long term labor market projections](#) data science employment will experience a growth rate of 40% through 2032 and is expected to be one of the strongest growth areas for professional jobs in the state.

Within the data analytics degree students select from three pathways depending on their goals and interest. Each pathway can also be pursued independently through a certificate supported by financial aid. The three pathways include: ***data science, business analytics, and healthcare applications.***

Data Science

The Data Science pathway emphasizes a solid foundation in higher mathematics and computational skills. Students learn to analyze complex data—both structured and unstructured—using advanced techniques in predictive modeling and programming languages like Python and SQL. This pathway is ideal for students who plan to pursue advanced studies in data analytics and related fields such as statistics, machine learning, and artificial intelligence, at the baccalaureate level and beyond.

Business Analytics

The Business Analytics pathway focuses on applying data to inform decision-making in both public and

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private sectors. The course content is regularly updated based on input from local employers to ensure students develop relevant, marketable skills. Graduates are prepared for entry-level analytical roles such as business intelligence analyst, marketing analyst, and human resources analyst, while also having the foundation to pursue further studies in business analytics.

Healthcare applications

The Healthcare Applications pathway integrates study of data analytics with key areas of public health, medical terminology, U.S. healthcare systems, and healthcare IT, including Electronic Medical Records (EMR) applications. This pathway equips students with the skills needed for data-intensive roles in the healthcare sector (research assistant, health insurance analyst, healthcare quality analyst, and other data-focused positions) or to pursue further study in healthcare administration, public health, and related fields at the baccalaureate level and beyond.

Most courses are available online and the entire degree program is available fully online. However, several courses have additional sections offered in person on the Nashua campus for interested students. This program has multiple articulation agreements for transfer options to local public and private colleges for completion of four-year degrees (See Appendix A). (Retrieved on 9.2.25 – Data Analytics Program [Nashua Community College](#))

Program Statement (Mission Statement)

Each department's mission clearly defines their role in the academic area and lets students and others know how they contribute to the institutions' mission by helping them with their development and experience at the institution. A mission statement indicates what is being done. It states the cause, action, and impact. They are specific, succinct, and straightforward. The Program Statement should define what the program achieves/does, describe the community the program is designed to serve, and state the values and guiding principles which define its standards. (Retrieved [UCONN](#), 2022).

State your current Program Mission Statement (indicate whether it is published in the Academic catalog), describe what work was done to arrive at the Mission Statement and when it was last reviewed/adjusted. Additionally, please incorporate the following questions into your summary. If there was feedback during the review year, please incorporate how the feedback was considered/utilized.

- In what ways is the program statement aligned with the institutional mission and strategic goals?
- In what ways is the statement representative of contemporary, relevant, and inclusive language?

Program Statements answer the following questions:

Who am I	Name of Program / Career Pathway
Who Will I Serve	Stakeholders
What Will I Do	Primary Purpose
How will I do it	Primary Function

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Summary:

In 2022, through program review, the Technology and Sciences department reviewed the Mission / Program Statement. It was noted that the last review took place in 2017. There were significant changes made including changes in language, clarity, removed “goal statements” and reduced lists of what we do. The department used parts of the framework offered through program review resources and researched other community college statements. The program statement supports the institution’s overall mission and indicates the primary learning elements. As a result of the changes made, the department submitted a curriculum change form to ensure the updates statement was represented in the Academic Catalog. The statement has been published in the catalog and on our website since fall 2023.

The program focuses on students’ preparation in a multitude of industries and further prepares them for educational advancement. The program prepares students for workforce & community impact by addressing employer needs in the field of analytics. Additionally, with articulation agreements across several 4 – year public and private institutions, students can further develop their knowledge and skills to advance learning through a bachelor’s degree. With the integration of “real-world” projects and “labs” the curriculum aligns with High Impact Practices increasing student success efforts. Lastly, students find diverse pathways by exploring through certificate programs, refining and advancing current knowledge and skills for workforce advancement as well as continued education.

Mission Statement

“The associate degree in data Analytics prepares students to translate raw data into meaningful insights across industries. Students learn to collect, clean, analyze, visualize, and communicate data using tools like Python, SQL, and visualization platforms. Through real-world projects and labs, students build technical confidence and critical thinking needed for entry-level analytic roles and seamless transition into a bachelor’s program”.

Program Goals

Goals are broad strokes that are not measurable. They indicate what is expected to be accomplished; a result and are overarching. They reflect the program mission statement. They include pedagogy competency attainment, accreditation / licensure requirements, and what students will accomplish. Goals are often used in programs that are regulated by an external agency. While not required, goals are often used when developing program level learning outcomes.

This is not a required section (and was not a required deliverable in Year Zero). State your current Program Goals (indicate whether they are published in the Academic catalog), describe what work was done to arrive at the development of the Goals and when they were last reviewed/adjusted/developed. Additionally, please incorporate the following questions into your summary. If there was feedback during the review year, please incorporate how the feedback was considered/utilized.

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- Is there alignment? How does it relate to the program statement?
- How does the program fit into the student's development?
- What types of knowledge, skills, abilities will distinguish your graduates?
- Are key competencies articulated? (Retrieved, 2022-Uconn Assessment)

Summary:

The department's goals are not published but are discussed at the beginning of every year. They frame the department's efforts to achieve program level learning outcomes. Key competencies are expanded from the Program's Mission Statement in the goals. Furthermore, goals are grounded in Labor Market research on skills needed and desired by employers. The goals are separated into four areas of learning. Within each area, curriculum development is discussed, and the execution of SMART goals, pedagogical initiatives, curriculum outcomes, and teaching practices are explored.

Data Processing & Analysis:

- Learn to handle and analyze both qualitative and quantitative data to find patterns, highlight issues, and solve problems.

Analytics Tools & Technologies:

- Develop proficiency in common industry tools such as SQL for databases, Python for programming, and data visualization tools like Tableau or PowerBI.

Data Visualization & Reporting

- Gain the ability to present data findings effectively through reports, presentations, and interactive data visualizations.

Foundational Knowledge:

- Gain a solid understanding of core technical skills, statistics, and database concepts essential for a data analytics career.

Program Learning Outcomes (PLOs)

The Program Statement and goals provide the framework for determining the more specific Program educational learning outcomes. Educational outcomes are both at the course level and at the program level. In the case of Program outcomes, these statements define what students will know or be able to do as a result of curriculum learning experiences specific to degree programs/certificates/career pathways. ([Learning Assessment Research Consortium-LARC](#)).

State your current Program Level Learning Outcomes (indicate whether they are published in the Academic catalog), describe what work was done to arrive at the Program Level Learning outcomes and when they were last reviewed/adjusted. Additionally, please incorporate the following questions into

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your summary. If there was feedback during the review year, please incorporate how the feedback was considered/utilized. (The discussion regarding measuring PLOs will come later in the report)

- Explain PLO alignment with the Program Statement
- Explain, if applicable, representation of accreditor or licensure standards

Summary:

The Data Analytics Program currently has five Program Level Learning Outcomes, which are published in the College's Academic Catalog (last updated 2023–2024 edition):

1. Apply statistical methods and analytical tools to organize, interpret, and communicate data effectively.
2. Demonstrate proficiency in industry-standard data visualization software and techniques.
3. Analyze complex data sets to identify patterns, trends, and actionable insights.
4. Interpret ethical, legal, and social implications of data use in decision-making.
5. Collaborate effectively in teams to design and deliver data-informed solutions.

Development and Review Process

These PLOs were developed in 2020 through a faculty-led working group with input from the Advisory Committee, which includes regional employers and transfer partners. The most recent review occurred in Spring 2023, as part of the regular 5-year plus + curriculum cycle. Adjustments were made to strengthen Outcome 4 (ethics and social implications), based on both employer feedback and emerging best practices in the discipline.

Alignment with the Program Statement

The Program Statement emphasizes preparing students for immediate workforce entry as well as seamless transfer into four-year data-related programs. The PLOs reflect this dual mission by balancing applied technical skills (Outcomes 1–3) with professional and ethical competencies (Outcomes 4–5). This ensures graduates are prepared not only to manipulate and analyze data but also to act responsibly in diverse workplace settings.

Accreditor and Licensure Standards

Although the Data Analytics Program is not subject to licensure, the PLOs were benchmarked against the Association for Computing Machinery (ACM) Data Science Curriculum Guidelines (2021) and regional employer job postings. This alignment ensures graduates gain competencies recognized across higher education and industry.

Use of Feedback

During the 2022–2023 review year, feedback was collected through student exit surveys, employer advisory board discussions, program review and faculty reflections. Students expressed strong

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preparation in technical areas but did not have a desire for more practice in collaborative projects. Employers emphasized the need for ethical awareness and communication of findings to non-technical audiences. Program Review feedback suggested a closer look at how each PLO was written to prepare for assessment later in the program review cycle. This feedback informed us of three changes:

- Expanding capstone projects to include cross-disciplinary teams.
- Revising Outcome 4 to emphasize the ethical and social implications of data use.
- Review of all PLOs for better structure in the delivery of strong assessments.

The discussion of PLO measurement will occur later in the report. Planned actions include mapping outcomes to core course assignments and piloting embedded assessments in Fall 2024.

Curriculum Map

The first step in a series of Program Review deliverables that will occur over the next 5 years. Curriculum Mapping is an outcomes assessment process involving an analysis of the curriculum. Mapping is an evidence-based way that organizes a visual matrix/tool used to identify relationships between different institution learning structures. The map can demonstrate the types of learning taking place and how that learning occurs. To ensure that program [and discipline] curriculum provides appropriate conditions for student achievement of intended program [and discipline] learning outcomes (Palomba & Banta, 1999) process examines the connections (and/or misconceptions) within a program's progression of student knowledge/skill/application of subject matter, identifies general education competency pathways, and incorporates institutional goals/mission. (Learner-Centered Assessment on College Campuses: shifting the focus from teaching to learning by Huba and Freed 2000)

Provide a link to the department/program's most updated curriculum map (this should be in your year 5 PR folder via SharePoint/OneDrive). Please incorporate the following questions into your summary. If there was feedback during the review year, please incorporate how the feedback was considered/utilized.

- Explain how (if any) of the GenEd competencies contribute to the PLOs? Will students be expected to apply any GenEd skills as they move into their program courses?
- How do Program Courses contribute to Program Level Outcomes? Are any courses carrying the burden of an outcome on their own? Are course contributions spread out in a structured, meaningful and purposeful way to benefit the students from learning experiences?
- Are the levels of learning organized in a progressive manner? Are students introduced to PLO skills/concepts before expected to demonstrate them? Are courses expected to provide all three levels and does course content ensure this learning?

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Summary:

Faculty reviewed all required program and general education courses, analyzing how each course contributes to PLO achievement through the Year Zero & Year One deliverables. The mapping applied the Introduced → Practiced → Demonstrated model of learning progression given instructions provided. This work was completed in Spring 2021 with changes in Spring 2023 and most recently Spring 2025 in collaboration with the Advisory Committee, the Transfer Office, Director of Curriculum Engagement and the Director of Institutional Assessment.

General education courses provide foundational skills that are reinforced within the program curriculum. For example, ENG 112 (College Writing II) strengthens communication skills tied directly to PLOs 1 and 5. MAT 121 (Statistics I) contributes core quantitative reasoning needed for PLOs 1 and 3. Students apply these competencies in upper-level program courses such as DAT 210 and DAT 220.

The mapping confirmed that no single course carries the full burden of a PLO. Instead, contributions are distributed intentionally across the two-year sequence. For example, PLO 3 (analyzing complex data sets) begins with introduction in MAT 121 and DAT 101, is practiced in DAT 201, and culminates with demonstration in DAT 220 and the Capstone Project. This balanced design ensures students receive multiple opportunities to deepen learning before being expected to demonstrate mastery.

The curriculum map shows that learning is scaffolded appropriately. Students are introduced to skills early, practice them through several courses, and ultimately demonstrate them in advanced coursework. The capstone ensures that all five PLOs are revisited and demonstrated in an integrative, team-based project. No course is expected to provide all three levels of learning, though several courses (e.g., DAT 210) span both practice and demonstration phases.

The faculty examined where and how High Impact Practices (HIPs) were embedded across the program. HIPs are known to increase student engagement, retention, and achievement, particularly when integrated purposefully into program-level outcomes. Faculty used support provided by the Director of Curriculum Engagement and the Bristol HIPs Libguide framework for HIPs to identify existing practices and opportunities for enhancement.

Identification Process

- Faculty and the Advisory Committee reviewed course syllabi and mapped potential HIPs alongside the PLO curriculum map.
- Student feedback highlighted the value of applied hands-on learning, which guided emphasis on project-based and collaborative HIPs.
- Employer feedback emphasized teamwork and communication with non-technical audiences, prompting stronger integration of service-learning and collaborative assignments.

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HIPs were intentionally scaffolded to align with the *Introduced* → *Practiced* → *Demonstrated* model. For example, students are introduced to collaborative learning in *DAT 101*, practice it in *DAT 220*, and fully demonstrate teamwork and applied learning in the *Capstone Project*. Writing-intensive components and research opportunities are distributed across general education and program-specific courses, ensuring that communication and ethical reasoning skills are reinforced throughout the curriculum.

Student surveys indicate that these practices not only build technical competence but also confidence in applying skills in real-world contexts. Employers consistently rate the capstone projects highly, citing the strong blend of technical accuracy and clear communication.

During the 2023 review cycle, employers and transfer partners expressed the importance of ethical awareness (PLO 4) and teamwork (PLO 5). As a result, ENG 112 was mapped to reinforce professional writing on ethical implications, and the Capstone Project was adjusted to include explicit evaluation of team collaboration. Student surveys also indicated a need for more exposure to visualization tools earlier in the program; in response, DAT 101 now introduces visualization concepts rather than waiting until DAT 210.

Faculty plans to formalize service-learning partnerships in *DAT 210* and expand undergraduate research opportunities by integrating more employer-based data challenges earlier in the program.

Analysis of Program Data

A Program Review explores learner achievement by reviewing and interpreting their targets through a process of data analysis, comparison to peers, and investigatory discourse. Reflecting on low enrollment, retention and/or persistence rates along with any missed targets-specifically for BIPOC populations-could prompt many innovative shifts aimed at improving learning and identifying needs.

As you prepare this section, please organize your findings into a clear narrative that highlights both what the data shows and how your department is making meaning of it. Your summary should be comprehensive but focused, weaving in analysis, interpretation, and forward-looking strategies. Please incorporate the following questions into your summary. If there was feedback during the review year, (and the data template helped organize findings, feel free to update and attach/add to PR folder or provide a link in this document) if you had an accreditation visit with feedback, please incorporate how the feedback was considered or is being utilized.

- Your programs definition and measures of success for your students. Are there differences between institution metrics and program metrics.
- Describe recruitment and enrollment within your department or program by addressing historical enrollment trends and the demographics of your students. Comment on factors that appear to support or hinder enrollment and propose strategies your program is using to maintain or improve these outcomes.

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- Reflect on how students are making use of available support services, and examine how performance differs across demographics, campus locations, and course delivery methods (e.g., online vs. face-to-face). Your goal is to connect these insights back to the overall student experience in your program.
- Summarize any areas you have investigated recently, or that you are actively exploring, such as department-led self-studies or research projects on topics of relevance. If applicable, integrate additional data sources into this discussion.

Conclude by synthesizing your findings into a forward-looking perspective. Highlight both your program's strengths and the areas where adjustments may be needed, keeping in mind the broader institutional mission and the needs of your students. This section should not only reflect the work done but also point toward the work ahead.

Summary:

In alignment with the college's mission, the Data Analytics Program is committed to fostering equitable student achievement and preparing graduates to thrive in a data-driven workforce. This analysis not only reflects work accomplished but also establishes a foundation for continuous improvement across the next five years of program review.

Enrollment in the Data Analytics Program has shown modest growth since its launch in 2020, with the largest increase occurring between Fall 2021 and Fall 2022 (from 38 to 57 declared majors). However, growth slowed in 2023–2024, stabilizing at 54 majors. This plateau coincided with regional workforce shifts, including employer uncertainty around hybrid work and the rise of short-term credentials offered by private providers.

Demographically, the program enrolls a diverse student body: 42% identify as BIPOC, 36% are first-generation, and 28% are adult learners (25+). Recruitment data suggests strong appeal among students seeking career change or advancement, but challenges remain in attracting recent high school graduates who may be less familiar with “data analytics” as a discipline. To address this, the department launched new outreach efforts with local high schools and participated in STEM career fairs.

First-year to second-year retention averaged 69% over the past three cohorts, slightly below the college-wide average of 73%. Data disaggregation revealed retention gaps among BIPOC students (64%) and part-time adult learners (61%). These findings echo feedback from our Spring 2023 student focus groups, which identified limited access to flexible course scheduling and lack of awareness about tutoring resources as barriers to persistence.

Students who engaged with campus support services (tutoring, advising, writing center) showed higher course completion rates across all demographics (82% vs. 69% without engagement). However, utilization of services varied significantly: online students were less likely to access in-person resources, while students at satellite campuses reported fewer support options. These insights have already

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informed department conversations about increasing online tutoring hours and embedding “resource spotlights” into first-year courses.

Face-to-face students demonstrated higher persistence into the second year (72%) compared to fully online students (63%). Course-level analysis showed the widest performance gaps in DAT 201: Data Management & SQL and DAT 220: Predictive Analytics. Faculty believe these gaps are tied to the need for structured, synchronous practice in technical skill-building. As a result, beginning in Fall 2024, DAT 201 will adopt a hybrid delivery format with required synchronous lab sessions for online learners.

In 2023, faculty completed a self-study on gateway course performance, focusing on MAT 121: Statistics I and DAT 101: Foundations of Data Analytics. Findings revealed disproportionately high withdrawal rates among BIPOC students in MAT 121 (22% vs. 12% for the program overall). To address this, the program is piloting a co-requisite statistics support lab designed to provide embedded tutoring and contextualized assignments related to data analytics. Early results from the pilot (Fall 2024 midterm data) suggest improved persistence, particularly for first-generation students.

Additionally, the department participated in a regional benchmarking project with peer colleges. Data showed that while our enrollment growth lagged peers, our capstone completion and job placement rates were higher (82% of graduates employed within six months vs. peer average of 76%). These findings highlight program strength in workforce alignment, while underscoring the need to improve recruitment pipelines.

[If applicable] During the most recent institutional accreditation visit (2022), reviewers noted the program’s strong employer partnerships but recommended a more systematic approach to tracking equity gaps in outcomes. In response, the department began disaggregating course success and retention data by race/ethnicity and delivery method, which directly informed the strategies outlined above.

The analysis points to a program with strong workforce outcomes and employer trust, yet one facing challenges in enrollment growth, equity gaps, and retention. Moving forward, and as stated in several SMART Goals, the program will:

- Strengthen recruitment pipelines with high schools and adult learner outreach.
- Expand flexible scheduling and hybrid formats to improve persistence.
- Enhance equity-focused interventions such as the statistics co-requisite lab.
- Build awareness and access to student support services, particularly for online and satellite campus learners.
- Continue systematic disaggregation of program data to guide decision-making.

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Curriculum and Instruction

Provide an overview of how your program's curricula meet the needs of students and the institution. Reflect on the relevance, effectiveness, and responsiveness of your course offerings, and explain how the curriculum aligns with your program's instructional objectives, departmental goals/Program Mission Statement, Labor Market demands and/or Transfer Readiness. **This section will be split into three parts: High Impact Practices, culturally responsive & Inclusive Practices and labor Market Alignment and/or Transfer Readiness.**

Summarize the instructional strategies faculty are using to engage students and to ensure instruction remains responsive to both student and institutional needs. Describe how your faculty involve students actively in the learning process, and highlight innovative approaches such as technology integration, new pedagogies, or other subject-specific strategies. In addition, include information about faculty engagement with professional development opportunities that enhance instructions.

Conclude your narrative by reflecting on the overall effectiveness of your program's curriculum and instruction. Identify strengths, areas for growth, and opportunities to further align your department's objectives & success.

High Impact Practices HIPs

High-Impact Practices are research based educational strategies which are associated with better student outcomes. Research suggests that the following eight elements tend to make HIPs effective. When done well, High-Impact Practices (HIPs) improve student learning which in turn tends to improve other outcomes, such as retention rates, sense of belonging, self-efficacy, engagement, and more.

As you prepare this section, please organize your presentation of HIPs into a clear narrative that highlights both what the data shows (evidence of impact) and how your department is making meaning of it. Please incorporate the following questions into your summary. If there was feedback during the review year, (and the data template helped organize findings, feel free to update and attach/add to PR folder or provide a link in this document) if you had an accreditation visit with feedback, please incorporate how the feedback was considered or is being utilized.

- What HIPs are being used and what elements are being used to accomplish success?
- Please describe any experiential education examples or pedagogies at work in your department/program, including:
 - Clinical fieldwork, internships, service-learning, sustainability, externships, etc
- How have you determined success or areas of further consideration. Here is where you can share a description of any experiential education (that may not necessarily rise to a HIP or has formally been identified as a HIP) examples or pedagogies at work. You may include Open Education Resources in this section as well. Incorporate program review feedback or accreditation visit feedback and what feedback was considered or is being utilized. Year One of PR should help to guide this work.

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Summary:

The Data Analytics Program intentionally embeds High-Impact Practices (HIPs) throughout the two-year curriculum to strengthen student engagement, retention, and applied learning outcomes. Guided by the eight elements of effective HIPs (significant time and effort, meaningful interaction, feedback, diversity, reflection, real-world application, and public demonstration), the department has designed learning experiences and developed assessment tools that connect theory with practice while promoting equity and access. By embedding High-Impact Practices intentionally and assessing their effectiveness, the Data Analytics Program advances its goal of cultivating engaged learners who are prepared to contribute meaningfully in data-informed environments while reflecting the college's commitment to equitable, applied education.

Through curriculum mapping (see attached/link) and instructional review, four primary HIPs were identified within the program:

Project – Based Learning

DAT 210 – Data Visualization & DAT 250 – Capstone Project

Aligned Elements – High expectations, applied learning, feedback, public demonstration

Description:

Students work on real datasets from community partners to design visual dashboards and present findings in a showcase attended by employers and peers.

Collaborative Assignments

DAT 220 – Predictive Analytics

Aligned Elements – Interaction, reflection, diversity

Description:

Teams analyze anonymized employer data, navigate version control tools, and present interpretations collaboratively. Peer review and reflective journals reinforce communication and accountability.

Writing-Intensive & Ethical Reflection

ENG 112 College Writing II

DAT 101 Foundations

Aligned Elements – High expectations, real-world application, public demonstration

Description:

Students synthesize program learning by designing an applied data solution for a nonprofit or local employer, integrating all PLOs.

Each HIP was evaluated against the program's five PLOs and General Education Competencies to ensure alignment and intentional reinforcement across the curriculum. The department used course evaluations, student reflections, and capstone assessment rubrics to assess the impact of HIPs.

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Students participating in project-based and collaborative HIPs demonstrated higher retention (74%) compared to non-HIP course averages (67%) and reported stronger confidence in technical communication and teamwork. BIPOC students and first-generation learners showed the largest gains in persistence within HIP-integrated courses, suggesting these experiences promote belonging and self-efficacy. Feedback revealed that while students valued real-world projects, they sought clearer guidance on group roles and expectations early in the term. In response, faculty are developing a “Team Contract” tool for use in collaborative assignments and refining project scaffolding to better distribute workload and accountability.

As a new initiative (not yet assessed), for experiential learning, DAT 210 now includes a “Data-in-the-Wild” assignment where students collect and clean raw data from public sources, practicing data ethics and applied reasoning.

The Capstone Project increasingly partners with nonprofit organizations, connecting student projects to community needs and extending experiential learning beyond the classroom. We are in the beginning stages of assessment.

In addition to formal HIPs, open practices support student learning are intentionally embedded in the curriculum. Faculty replaced commercial data analytics texts with OER materials and instructor-developed case studies. This reduced textbook costs and allowed customization using local and industry-specific data sets.

During the PR Year three/four review cycle, advisory board members affirmed the value of hands-on, employer-connected projects but encouraged inclusion of cross-disciplinary collaboration with business and healthcare programs. This recommendation is being piloted in the upcoming year, with a joint analytics challenge involving both departments. Accreditation feedback (2022 visit) also emphasized documenting evidence of learning impact across diverse populations, which led to disaggregated HIP outcome tracking beginning in Fall 2024.

The department recognizes HIPs as central to the program’s mission of fostering applied, equitable learning. Moving forward, the program will:

- Formalize a structured evaluation process for HIPs using standardized rubrics and student reflection data.
- Expand service-learning partnerships to include more regional employers.
- Broaden faculty professional development in inclusive HIP design and OER integration.
- Continue tracking HIP-related learning gains and retention outcomes across demographics.

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Culturally Responsive & Inclusive Practices

Culturally responsive practices are an approach that acknowledges and respects the diverse cultural backgrounds, experiences, and perspectives of students. It aims to create an inclusive learning environment that supports academic success and overall well-being of all students. These initiatives reflect a commitment to creating an inclusive and culturally responsive learning environment, where students from diverse backgrounds can thrive and succeed academically.

Program review included a selection of 4 out of 8 categories reflecting culturally responsive & inclusive practices, Bristol Community Colleges strategic objectives, the institutions' mission, and the state's equity agenda. Furthermore, given the work influenced by faculty members and best practices, these 8 areas account for a holistic approach to Program DEI work.

- Valuing and incorporating diverse cultural voices & perspectives
- Creating inclusive and relevant curriculum
- Creating collaborative, inclusive and affirming learning environments
- Providing professional development for faculty (within program and institution-wide participation)
- Supporting culturally relevant assessments
- Utilizing support services for diverse student populations
- Engaging with the local community
- Engaging in Reflective Teaching and Continuous Learning

As you prepare for this section, please refer to year two work. Organize your narrative by first presenting the categories assessed, supporting documentation, feedback (including the rating) that was provided during the review year (feel free to attach the completed assessment template or a link) and steps you've taken for continuous improvement – if applicable. Lastly, provide steps taken given a rating scale assessed at practices partially being met or below.

Rating Scale

- Insufficient Evidence/Unable to Rate
- Practices are being discussed/explored but not yet implemented
- Practices are partially being met
- Practices are being met
- Practices go beyond recommended criteria

Narrative

Document the reasoning and evidence for the rating assigned or summarize the reflection and action. Explain what evidence has been collected and reviewed to support program rating.

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Summary

The Data Analytics Program continues to advance culturally responsive and inclusive practices as part of its multi-year Program Review and alignment with Bristol Community College's strategic objectives and the Massachusetts equity agenda. During Year Two of the review cycle, the program assessed four of the eight institutional DEI categories:

1. Valuing and Incorporating Diverse Cultural Voices & Perspectives
2. Creating Inclusive and Relevant Curriculum
3. Creating Collaborative, Inclusive, and Affirming Learning Environments
4. Providing Professional Development for Faculty

These focus areas were selected based on departmental priorities identified and ongoing institutional initiatives in teaching and learning equity. Supporting evidence for each rating and reflection is included in the Year Two program's SharePoint folder [Insert Link].

Valuing and Incorporating Diverse Cultural Voices & Perspectives

Program Rating: Practices are being met

Feedback Rating: Evidence of practice illustrated to support rating [insert given year 2 feedback] Agree

Feedback Rating: Assessment is being conducted to determine impact [insert given year 2 feedback]
Agree

Evidence and Reflection:

Faculty reviewed syllabi and instructional materials across all core courses to ensure representation of diverse data sources, research topics, and case studies. For instance, *DAT 210: Data Visualization* now includes datasets related to public health equity, climate impacts, and demographic diversity, encouraging students to interpret data within sociocultural contexts. Guest speakers from diverse professional backgrounds have been integrated into the *Capstone Seminar Series* to expose students to varied career narratives.

Continuous Improvement:

Faculty identified a next step to collaborate with the Institutional Research Office to source community-based datasets that reflect local demographic realities, strengthening place-based learning and relevance.

Program Rating: Practices are being met

Feedback Rating: Evidence of practice illustrated to support rating [insert given year 2 feedback]

Agree

Feedback Rating: Assessment is being conducted to determine impact [insert given year 2 feedback]

Agree

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Creating Inclusive and Relevant Curriculum

Program Rating: Practices go beyond recommended criteria

Feedback Rating: Evidence of practice illustrated to support rating [insert given year 2 feedback]

Strongly Agree

Feedback Rating: Assessment is being conducted to determine impact [insert given year 2 feedback]

Strongly Agree

Evidence and Reflection:

Curricular revisions over the past year emphasized accessibility and inclusivity. Open Educational Resources (OER) were adopted for *DAT 101* and *DAT 220*, reducing financial barriers and allowing contextual customization of materials. Assignments were redesigned to include “data ethics and bias” modules, requiring students to examine how systemic inequities influence data interpretation.

Students reported in focus groups that they felt more connected to coursework when they could explore data tied to their own communities and lived experiences. This finding reinforced the program’s commitment to embedding equity-based examples rather than treating them as stand-alone topics.

Continuous Improvement:

Faculty plan to expand culturally relevant data sets into general education courses linked to the program (e.g., Statistics, English Composition) and to integrate reflective writing prompts around positionality in data interpretation.

Creating Collaborative, Inclusive, and Affirming Learning Environments

Program Rating: Practices are partially being met

Feedback Rating: Evidence of practice illustrated to support rating [insert given year 2 feedback]

Agree

Feedback Rating: Assessment is being conducted to determine impact [insert given year 2 feedback]

Disagree

Evidence and Reflection:

Student surveys indicated that teamwork experiences in *DAT 220: Predictive Analytics* were generally positive but that some students—particularly those learning remotely—felt less connected to peers. The department analyzed group participation data and found lower engagement among online and part-time students.

In response, the faculty introduced a “Team Agreement and Reflection” tool and implemented hybrid collaborative workshops using virtual breakout sessions to foster equitable participation. The next program review cycle will examine whether these interventions increase belonging and engagement across modalities.

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Continuous Improvement:

Planned actions include piloting cross-program collaboration with Business and Health Science students in a joint data challenge to enhance community and peer connection.

Providing Professional Development for Faculty

Program Rating: Practices are being met

Feedback Rating: Evidence of practice illustrated to support rating [insert given year 2 feedback]

Agree

Feedback Rating: Assessment is being conducted to determine impact [insert given year 2 feedback]

Agree

Evidence and Reflection:

All program faculty participated in at least one professional development opportunity related to culturally responsive pedagogy in the last academic year, including workshops through the Center for Teaching Excellence and the “Data for Equity” regional symposium. One faculty member completed a microcredential in Inclusive Teaching through AAC&U.

Reflections from these sessions were shared in departmental meetings and applied to redesign course assessments to be more culturally relevant and flexible in demonstrating mastery (e.g., allowing oral presentations or visual projects in place of written reports).

Continuous Improvement:

The department plans to establish a “DEI Teaching Roundtable” for faculty to share strategies and assess progress collectively each semester.

Overall, the Data Analytics Program demonstrates strong progress in embedding culturally responsive and inclusive practices. Evidence shows meaningful integration of diverse perspectives into the curriculum, adoption of equitable learning resources, and faculty engagement in ongoing development. While inclusive classroom culture is improving, online belonging and participation remain areas of focus.

Next Steps

- Expand access to community-based datasets reflecting local diversity.
- Enhance online learning inclusion through intentional group design and mentorship.
- Continue faculty professional development with structured reflection and peer exchange.
- Strengthening the link between culturally responsive teaching and student outcomes through disaggregated data analysis in Year Three of Program Review.

These efforts align with the College’s mission to advance equity, foster inclusive excellence, and prepare students from all backgrounds to thrive in data-driven and socially conscious workplaces.

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Labor Market Alignment and/or Transfer Readiness

How do we know if labor market alignment activities have been successful for students, employers, and local economies? How do we know if students engaged in Transfer Programs are transfer ready? Here you will use program review year three to assist in completing this section.

Organize your narrative by first presenting the Program Type – Transfer, Career, or Transfer & Career. Do you anticipate any changes given the program type?

Focus primarily on the SWOT Analysis section of your annual report. Include an analysis of labor market demand and how well your program prepares students for related career paths, placement rates of graduates, or evidence of transferability of courses to partner universities. Provide supporting documentation or a narrative providing context for each area of the SWOT analysis, feedback that was provided during the review year and steps you've taken for continuous improvement – if applicable.

Consider the following categories used when presenting your SWOT analysis

Career	Transfer	Career & Transfer
Data Informed Decisions	Data Informed Decisions	Data Informed Decisions
Regional Trends	Transfer Process	Regional Trends
Occupations & Income/Debt Ratio	Course Selection	Occupations & Income/Debt Ratio
Growth Potential	Articulation Agreements	Growth Potential
Industry/Education Partnerships	Academic & Professional Advising	Industry/Education Partnerships
In-Demand Skills	Policy & Structure	In-Demand Skills
Divergent Views / Goals	Credit Transfer	Divergent Views / Goals
	Location & Modality Flexibility	
	Divergent Views / Goals	

Additionally, please answer the following questions in narrative form:

- Discuss how your curriculum connects to pathways that support student success, including transfer opportunities, articulation agreements, or vertical alignment with high schools, precollege programs, and employers.
- Where possible, highlight examples of how these pathways are helping students advance toward their academic and career goals.

Summary Example #1 Career

Program Type: Career (A.S. in Data Analytics)

The Data Analytics Program is designed to prepare graduates for immediate entry into data-driven industries across Southeastern Massachusetts. The program emphasizes applied analytics, data visualization, and decision-making aligned with current employer expectations. Program Review Year

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Three focused on deepening the connection between curricular design, employer partnerships, and local workforce needs, as well as reviewing the program’s SWOT analysis for actionable improvement. Employer feedback/LightCast and O’Net (or other agencies used to gather data) during Year Three’s review emphasized a strong match between graduate competencies and job requirements. However, stakeholders suggested a greater focus on applied ethics and automation tools. In response, the program incorporated feedback into the revised 2025 curriculum cycle, adding a *Data Ethics and Governance* module.

The program connects to high school pre-college partnerships through dual enrollment in “Intro to Data Science.” Articulation pathways exist with UMass Dartmouth’s B.S. in Business Analytics. Employers actively engage in capstone evaluations, ensuring real-world applicability.

Example of Impact:

A recent graduate’s capstone project on regional energy consumption analytics was adopted by a local nonprofit, illustrating both skill alignment and community impact.

Category	Evidence & Interpretation	Continuous Improvement Actions
Data-Informed Decisions	Enrollment data indicate stable interest (4% increase since 2023), particularly among part-time students seeking upskilling opportunities. Employment outcomes show 85% placement within six months of graduation.	Integrate real-time labor data (via EMSI/Burning Glass) into annual curriculum discussions to maintain currency.
Regional Trends	Regional reports (MassHire, 2024) project 22% growth in data-related roles over five years, especially in healthcare and finance sectors.	Continue building employer advisory boards, ensuring alignment with evolving analytics tools (Python, Power BI).
Occupations & Income/Debt Ratio	Median starting salary of graduates: \$62,000; average program debt load: \$5,400—indicating a favorable return on investment.	Develop targeted career workshops to support salary negotiation and job readiness.
Growth Potential	Employers indicate high demand for analytics talent with strong communication and data ethics training.	Introduce a “Data Storytelling” elective to strengthen soft skill integration.

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Category	Evidence & Interpretation	Continuous Improvement Actions
Industry/Education Partnerships	New partnerships formed with SouthCoast Health and BayState Data Services for internships and capstone projects.	Plan expansion to include remote micro-internship opportunities.
In-Demand Skills	Employers consistently identify SQL, Excel, and visualization tools as essential. Feedback confirmed the need for AI-in-analytics exposure.	Pilot a “Machine Learning Foundations” module within the capstone sequence.
Divergent Views / Goals	Faculty emphasize broad data literacy, while industry seeks tool-specific proficiency.	Ongoing dialogue through employer roundtables and curriculum retreats.

The Data Analytics program demonstrates strong labor market alignment, meaningful employer engagement, and promising graduate outcomes. Moving forward, the department will explore stackable microcredentials and industry certification alignment (Google Data Analytics Certificate) to further support career readiness and institutional equity goals.

Summary Example #2 Transfer Readiness

Program Type: Transfer (A.A. in Liberal Arts)

The Liberal Arts Program provides a broad academic foundation for students planning to transfer to four-year institutions. During Program Review Year Three, faculty focused on enhancing course transferability, strengthening articulation pathways, and ensuring equitable advising for all student demographics.

Feedback from both transfer partners and alumni indicated strong preparation in writing, communication, and critical analysis skills. However, data also revealed a need for clearer advising in elective course sequencing to optimize transfer efficiency.

The program has established vertical alignment with local high school dual enrollment offerings in Composition and Psychology, ensuring early exposure to transfer pathways. Recent collaborations with UMass Dartmouth’s “Transfer Now” initiative provide reverse-transfer credit verification, ensuring degree completion.

Example of Impact:

A 2024 transfer graduate entered Bridgewater State as a junior with 62 accepted credits and completed her bachelor’s degree within two years, saving over \$15,000 in tuition.

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Category	Evidence & Interpretation	Continuous Improvement Actions
Data-Informed Decisions	Institutional transfer data show a 78% successful transfer rate, with 65% of graduates enrolling at UMass institutions.	Analyze transfer attrition by first-generation status to inform advising supports.
Transfer Process	Feedback from students identified confusion about course transfer equivalencies.	Created a “Transfer Success Dashboard” linking course maps to MassTransfer pathways.
Course Selection	82% of students complete MassTransfer Block courses within two years.	Introduced summer bridge advising sessions to support timely course sequencing.
Articulation Agreements	Articulation renewed with Bridgewater State and Framingham State for English and Psychology concentrations.	Expanding agreements with private institutions for flexibility.
Academic & Professional Advising	Advising survey results (Spring 2025) show high satisfaction among continuing students (92%), with lower satisfaction among online-only learners.	Pilot virtual peer-advising program to strengthen engagement.
Policy & Structure	New degree maps improved transparency and clarity of transfer pathways.	Annual review scheduled to ensure continued alignment with MassTransfer updates.
Credit Transfer	Over 95% of program credits accepted by partner universities.	Develop digital badges for completion of key transfer milestones.
Divergent Views / Goals	Faculty emphasize critical thinking and interdisciplinary learning, while transfer partners focus on discipline-specific depth.	Joint curriculum alignment sessions scheduled with transfer institution faculty.

The Data Analytics program demonstrates strong labor market alignment, meaningful employer engagement, and promising graduate outcomes. Moving forward, the department will explore stackable

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microcredentials and industry certification alignment (Google Data Analytics Certificate) to further support career readiness and institutional equity goals.

Program Learning Outcomes Assessment

Program Learning Outcomes (PLOs) directly assist in telling a story to determine program/department educational effectiveness. Assessment uses PLOs to determine if students are learning what the program intends to accomplish. The focus is on student learning and not the teaching activity. If the program provides learning outcomes, investigation into effectiveness is essential. This work informs practice and directs learning acknowledgment and improvement.

Continuous improvement practices of Program Learning Outcomes involve collecting and evaluating evidence of whether students are learning what the faculty intends, and at what level for specific outcomes. The design of this effort involves intentional alignment between the PLO and course assignment. There are two main types of evidence that are used:

- Direct Evidence: This type evaluates students' actual work using faculty specified criteria.
- Indirect Evidence: This type of evaluation looks at a student's self-reported or perceived learning (obtained skills, competencies).

In year three programs designed a program level learning outcome assessment analysis and plan for further development. There were several opportunities to address PLO assessment. Given year 3 and/or 4 findings, please describe your student learning outcome assessment process. You may embed the PLO Assessment document or upload it to compliment the below questions.

- which of the five (5) PLO Assessment option were used.
- identify program or departmental student learning outcome/s that you will assess or did assess to identify areas of and opportunities for continuous improvement
- a description of your department/ program plan that measured this outcome. Include details that were used in the PLO template and include the following:
 - Year measured
 - Program learning outcome
 - Course/s supporting PLO attainment
 - Course/s being measured for PLO attainment
 - Type of Evidence & Source
 - Population (Who Will Be Assessed)
 - Approach to Data Collection & Tools
 - **When Evidence was/will Be Collected**
- A description of your department/ program student learning outcome assessment results

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- a description of how these assessment data are being used to improve pedagogy and practice in your department/ program

Summary Example (1PLO is illustrated below)

Overview of the Program's Student Learning Assessment Process

During Year Three of the five-year plus one Program Review cycle, the Data Analytics Program implemented a structured Program Learning Outcome (PLO) assessment plan using a combination of option #1 and #3 but primarily course-embedded PLO assessment using a common rubric. This option allowed faculty to evaluate student artifacts tied to key program courses (Target classes included those that indicated “demonstrated” on the program’s curriculum map.), emphasizing alignment, measurement, and continuous improvement. The goal was to determine the effectiveness of student learning—not teaching activity—and ensure that program outcomes accurately reflect the skills faculty intend students to demonstrate. The program used both **direct evidence** (evaluated student artifacts) and **indirect evidence** (student perceptions and self-reported learning) to validate student achievement.

Program Learning Outcome (PLO) Assessment Table

PLO 3 – Analyze complex data sets to identify patterns, trends, and actionable insights.

PLO Assessment Plan Table (Modeled on Your Template)

Year Being Measured	Program Learning Outcome	Course(s) Supporting PLO Attainment	Type of Evidence & Source	Population (Who Will Be Assessed)	Approach to Data Collection & Tools	When Evidence was/will Be Collected
2024–2025	PLO 3: Analyze complex data sets to identify patterns, trends, and actionable insights	DAT 201: Data Management & SQL; DAT 220: Predictive Analytics; DAT 250: Capstone Project	Direct Evidence: Capstone project analytics report using standardized rubric (data cleaning, analysis method, insight quality). Indirect Evidence: Student exit survey self-ratings; employer feedback on capstone deliverables.	Graduating students enrolled in DAT 250 (Capstone), plus students completing DAT 220 in Spring 2025	Course-embedded assessment using faculty-scored rubrics; student survey administered via LMS; employer review form for capstone partners	Spring 2025 (collection); Summer 2025 (analysis); Fall 2025 (integration into curriculum)

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Assessment Findings and Recommendations

Summary of Direct Evidence (Student Artifacts)

- **78%** of students demonstrated proficiency or higher in analytical reasoning and insight generation.
- **14%** met minimum expectations but struggled with selecting appropriate statistical methods.
- **8%** did not meet expectations, with challenges primarily related to:
 - cleaning messy data
 - interpreting output correctly
 - articulating insights clearly
- Online learners scored, on average, **10 points lower** on interpretation components than hybrid students.

Summary of Indirect Evidence (Surveys & Employer Feedback)

- **87%** of students reported confidence in using analytics tools (SQL, Python, Tableau/Power BI).
 - Students routinely expressed uncertainty around *advanced statistical logic* and “explaining the why.”
 - Employer evaluators praised technical execution but encouraged increased emphasis on storytelling with data and business-context framing.
-

Recommendations Based on Findings

Increase instructional scaffolding for statistical interpretation; strengthen online learner supports; integrate a required “Insight Narrative” in capstone; expand case-based practice prior to DAT 250

Curricular Adjustments

- Strengthen statistical interpretation modules in **DAT 201** and **DAT 220**.
- Add required “Insight Narrative” component to **DAT 250** emphasizing:
 - reasoning
 - assumptions
 - interpretation
 - decision implications

Pedagogical Improvements

- Introduce scaffolded case studies using real-world, unclean datasets.
- Adopt a shared “Data Interpretation Mini-Rubric” across all courses leading to the capstone.

Modality Enhancements

- Create short “micro-tutorials” for online learners focused on:
 - interpreting statistical output
 - selecting analytical methods

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- Add optional synchronous labs twice per term for remote students.

Faculty Practice & Collaboration

- Continue monthly analytics pedagogy roundtables.
- Build a shared repository of annotated exemplar student analyses (with student permission).

Course Student Learning outcomes

Educational outcomes are at the course and program level. In the case of Program outcomes, these statements define what students will know or be able to do as a result of curriculum learning experiences specific to degree programs/certificates/career pathways. ([Learning Assessment Research Consortium-LARC](#)). Assessment uses PLOs to determine if students are learning what the program intends to accomplish. Part of that success requires attention to course student learning outcomes and their alignment to PLOs.

Course SLOs are statements that define what students will know or be able to do as a result of a course learning experience. They are intentionally prepared and aligned with course content, measured, and assessed for successful attainment. This deliverable had several options for chairs/coordinators to choose from. By choosing an option to further investigate course student learning outcomes, faculty can utilize work that best fits the department's needs. State which option was used and the rationale behind the choice.

- **Option #1** Course SLO Written Structure
- **Option #2** Course SLO Alignment with PLOs
- **Option #3** Course SLO Labor Market Alignment
- **Option #4** Course SLO Assignment Alignment

For the first option provide an explanation of each Course SLO edit/change and how the change strengthened the Course SLO. Then provide a plan for a more advanced assessment of those Course SLOs (which option will be used for future assessments of Course SLOs).

For the remaining options, please share the template used in either chart form or in another written format that presents the work completed (if Course SLOs were measured). Answer the following questions:

- a description of your department/ program plan as a result of the deliverable. and include the following:
 - Course
 - Course Student Learning Outcome/s (SLO)
 - Aligned Program Learning Outcome (PLO)
 - Assessment Method(s) Direct / Indirect Evidence
 - Population Assessed
 - Timeline for Evidence Collection
 - Findings & Recommendations

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- A description of your department/ program student learning outcome assessment results
- Highlights identified through assessment (Equity Insights, Faculty cross collaboration, student success)
- Recommendations for Improvement and a description of how these assessment data are being used to improve pedagogy and practice in your department/ program (Curriculum changes, Course PLO contribution, Assignment refinement, future assessment)

Summary Example (this example is not exactly aligned with option #2 but offers enough guidance to apply the work done within the deliverable):

Course: DAT 220 – *Applied Predictive Analytics*

Assessment Focus: Course SLO Alignment with Program Learning Outcomes (Option #2)

Option #2 – Course SLO Alignment with PLOs

This option was chosen because of Program Learning Outcome findings. The department focused on course SLO alignment with “demonstrated” learning making it advantageous to ensure that course-level learning aligns cleanly with program competencies. This work also revealed where assignments should be strengthened to support upcoming PLO measurement. The department used **Option #2: Alignment of Course SLOs with PLOs** to determine whether DAT 220 provides the learning conditions necessary for students to grow toward demonstration of Program Learning Outcomes. This option supported program continuity with Year 3–4 PLO assessment work.

The following five Course SLOs were reviewed and assessed:

1. Apply supervised learning models to real datasets.
2. Clean and transform data using SQL/Python.
3. Validate model accuracy using cross-validation and error metrics.
4. Communicate predictive results to non-technical stakeholders.
5. Identify ethical considerations in predictive modeling applications.

These outcomes were selected because they represent the backbone competencies for predictive analytics and have direct influence on PLO 1–5 performance.

Course SLO #	Course Student Learning Outcome (SLO)	Aligned Program Learning Outcome (PLO)	Assessment Method(s)	Direct / Indirect Evidence	Population	Timeline for Evidence Collection	Findings & Recommendations
SLO 1	Apply supervised learning models (e.g., linear regression,	PLO 3: Analyze complex data sets	Common predictive modeling assignment	Direct evidence: student model output & analysis	All students in DAT 220	Collected Spring 2025	Students are strong in model execution; they need improvement in interpreting model fit. Add scaffolded practice on diagnostics.

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	decision trees) to real datasets.		evaluated with rubric				
SLO 2	Clean, transform, and prepare data for predictive analysis using SQL and Python.	PLO 1: Apply statistical methods and tools	Lab-based performance assessment; SQL/Python notebooks	Direct evidence	All students	Spring & Fall 2025	Students excelled with SQL but struggled with Python-based transformation. Add micro tutorials & optional lab hours.
SLO 3	Validate model accuracy using cross-validation and error metrics.	PLO 3; PLO 2	Embedded quiz + applied validation section in project	Direct (artifacts); Indirect (self-confidence rating)	Enrolled majors	Midterm 2025	Validation concepts were inconsistently applied. Faculty developing a shared validation checklist.
SLO 4	Communicate predictive results clearly to non-technical audiences via visualization and narrative.	PLO 2: Demonstrate proficiency in visualization; PLO 5: Collaboration	Capstone-style presentation using dashboards	Direct (presentation rubric); Indirect (peer feedback)	All DAT 220 sections	End of term (Spring/Fall 2025)	High-quality visuals: written narratives are weaker. Introduce "Insight Narrative" practice earlier in semester.

Highlights Identified Through Assessment

Assessment of the Course SLOs for DAT 220 revealed several strengths and emerging areas of focus. Students demonstrated strong technical proficiency in executing predictive models, consistently producing accurate outputs and effective visualizations that aligned well with industry expectations. SQL skills continue to stand out as one of the program's strongest technical domains. Additionally, students showed meaningful awareness of ethical considerations in predictive analytics, although their analyses often reflected introductory rather than advanced depth. Faculty also observed important equity insights: online learners reported lower confidence in Python-based tasks, suggesting a modality-related skill gap, while English language learners excelled in visual communication but benefited from additional support in written narrative assignments. The assessment process itself highlighted productive faculty collaborations, shared rubrics and early calibration meetings greatly improved scoring consistency and the quality of feedback provided to students across course sections.

Recommendations

Based on the assessment results, several recommendations emerged to strengthen student learning in DAT 220. Faculty identified the need to deepen students' analytical reasoning by adding two structured ethics mini cases earlier in the semester and incorporating a dedicated module on model diagnostics to reinforce interpretation of R^2 , RMSE, and related error metrics. Pedagogically, instructors plan to integrate scaffolded "Insight Narrative" activities to help students articulate findings more clearly, and to expand optional synchronous Python review labs to better support online learners who reported lower

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confidence in this area. Assignment refinements will include a validation checklist embedded within predictive modeling tasks to improve consistency in how students evaluate their models, as well as the development of short micro-tutorials targeting common challenges in Python-based data cleaning. Looking ahead, the department will monitor whether these course-level enhancements translate into measurable improvements in PLO performance—particularly within the capstone—and will continue tracking differences across modalities to ensure equitable learning experiences for all students.

Example Summary:

Course: DAT 220 – *Applied Predictive Analytics*

Selected Option: Option #4 – Course SLO Assignment Alignment

This option examines how well key course assignments align with SLOs and whether the assignments provide the right evidence to measure student learning. It is especially useful when a program wants to verify that assignments are current, skills-based, and effectively scaffolded to support course and program-level outcomes.

DAT 220: Course Student Learning Outcomes

1. Apply supervised learning models (regression, decision trees, naïve Bayes) to real-world datasets.
2. Prepare datasets for analysis by cleaning, transforming, and engineering features.
3. Evaluate and validate predictive models using error metrics and cross-validation.
4. Communicate analytical results to non-technical audiences through clear visualizations and written interpretation.
5. Assess ethical considerations related to predictive modeling, including bias and fairness risks.

<u>Course SLO</u>	<u>Aligned Assignment (Example)</u>	<u>Assignment Skills/Expectations</u>	<u>Evidence Type</u>	<u>Alignment Strength</u>	<u>Recommendations</u>
SLO 1: Apply supervised models	Predictive Modeling Mini-Project	Students build, tune, and compare two models using Python	Direct	Strong	Add a required “model selection rationale” paragraph to strengthen reasoning.
SLO 2: Prepare datasets for analysis	Data Wrangling Lab (SQL + Python)	Students clean, join, filter, and engineer features in two environments	Direct	Moderate	Provide micro tutorials addressing common Python errors.
SLO 3: Validate predictive models	Model Evaluation Assignment	Students calculate RMSE, MAE, R^2 ; run k-fold validation; interpret results	Direct	Moderate	Add step-by-step validation checklist for consistency in analysis.
SLO 4: Communicate results to non-technical audiences	Client-Facing Insight Brief + Dashboard	Students create visualization dashboards and write narrative interpretation	Direct / Indirect (peer review)	Strong	Embed brief earlier-semester practice narrative to scaffold skills.

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<u>Course SLO</u>	<u>Aligned Assignment (Example)</u>	<u>Assignment Skills/Expectations</u>	<u>Evidence Type</u>	<u>Alignment Strength</u>	<u>Recommendations</u>
SLO 5: Assess ethical considerations in modeling	Predictive Ethics Case Study	Students analyze fairness and bias in a model and propose mitigation steps	Direct	Moderate	Incorporate diverse, real-world cases and provide one example analysis.

Narrative Summary of the Assignment Alignment Process

To understand whether DAT 220's assignments effectively measure student learning and support mastery of key skills, faculty conducted an assignment-to-SLO audit using Option #4. Each major assignment was mapped to its aligned course SLO(s), reviewed for clarity and rigor, and evaluated for the quality of evidence it generated. This process revealed strong alignment for assignments requiring hands-on modeling, communication of findings, and the integration of ethical reasoning. The Predictive Modeling Mini-Project and Insight Brief assignments were particularly effective in measuring applied learning and were consistently rated as strongly aligned.

However, the review also revealed opportunities for improvement, especially around scaffolding model evaluation and ethical analysis. Python-based data transformation tasks showed uneven performance across student groups, indicating the need for targeted support. The ethics assignment was highly relevant but needed more diverse case examples to deepen critical analysis. Faculty were able to clearly identify where instructional supports, pre-assignments, and clearer rubrics could strengthen alignment.

Highlights

Overall, the assignment alignment review showed that DAT 220 offers students' rich opportunities to demonstrate technical and analytical proficiency, communicate insights effectively, and apply ethical reasoning to predictive modeling. The strongest alignment was observed in assignments involving real-world data, full-model workflows, and analytics communication. Students consistently showed competence in hands-on modeling and visualization tasks, and they responded positively to assignments that mimic workplace scenarios. The review also highlighted the importance of support for online learners, who reported challenges managing Python workflows. Faculty collaboration during the alignment meeting strengthened shared expectations and created consistency across sections.

Recommendations

Based on the assessment, faculty agreed to revise early-semester activities to provide additional scaffolding for model evaluation, including sample walkthroughs and a validation checklist. Python support will be enhanced through short video micro-tutorials addressing common debugging issues, along with optional synchronous clinics. For the ethics component, the inclusion of two new real-world case studies will help students practice deeper, more nuanced ethical reasoning. Finally, writing-focused assignments such as the Insight Narrative will now be introduced earlier in the course to build confidence in communication before the final project.

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Faculty Preparedness & Professional Development

A review should encompass faculty composition, development, facilities, and resources relevant to student learning. [Year two deliverables](#) were meant to establish standards and assess each area in collaboration with area deans and department faculty. The final section within this area invites identification of unmet needs affecting teaching & student learning. Please provide a written description of each section with updated information.

Areas for Review:

Program Faculty Overview & Resources

- Composition & Development of the Faculty
- Facilities & Support
- Faculty Active Professional Development
- Community Engagement
- Needs Assessment

The Data Analytics program is supported by 2 full-time faculty and 4 part-time adjunct faculty who collectively teach the core technical courses, capstone experiences, and foundational computing coursework. At present, the faculty composition adequately supports Program Learning Outcomes (PLOs), but this capacity is fragile due to reliance on adjunct coverage for advanced electives. Full-time faculty shoulder the responsibilities of assessment, curriculum revision, employer engagement, and advising—areas central to sustaining student learning and curriculum integrity. While adjuncts bring valuable industry experience that strengthens relevance, inconsistency in term-to-term availability presents challenges for long-range course sequencing and continuous assessment cycles.

Anticipated Turnover

One full-time retirement is projected within the next three years. Without succession planning or a targeted replacement, this change may impact both instructional load and the PLO assessment pipeline. To minimize disruption, the department is developing course ownership transition plans, standardized rubrics, and assignment repositories to ensure stability for students regardless of instructional changes. Additionally, adjunct onboarding materials are being updated to improve continuity when instructors rotate.

Diversity and Cultural Competency

Faculty diversity has improved modestly, with one new adjunct who brings experience using data science for community health research in multilingual populations. While the faculty does not fully reflect the diversity of the student body, ongoing hiring practices emphasize lived experience with equity-focused analytics and inclusive pedagogy. All faculty completed at least one institutional culturally responsive teaching or equity-minded analytics workshop in the last academic year.

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Professional Development

Professional development (PD) remains a notable strength. Faculty participated in workshops on machine learning pedagogy, data ethics, OER development, and inclusive STEM teaching. These activities produced several tangible changes, including:

- introduction of “ethical checkpoints” in programming assignments;
- new OER-based visualization labs to replace costly textbooks; and
- collaborative redesign of the Capstone rubric to emphasize communication and equity considerations.

Overall, PD participation has directly improved the program’s rigor, relevance, and inclusivity.

Facilities & Support

The program currently uses computer labs equipped with Python, SQL, and visualization software (Power BI/Tableau), which adequately support achievement of PLOs when equipment is functioning, and software is up to date. However, access differs across campuses. The Fall River campus provides the most robust lab environment, while satellite locations occasionally rely on outdated machines, impacting performance for Python-heavy tasks. Students in online sections depend heavily on remote-access tools and report challenges when local devices cannot handle large datasets.

The library’s support for research, data ethics materials, and OER development has meaningfully contributed to student learning. Students frequently use writing center services when preparing narrative interpretations for analytic reports. Advising and career services staff have become important partners in supporting students transitioning into analytics internships and entry-level work.

Evidence of service impact includes:

- higher capstone completion rates among students who used writing or tutoring services (87% vs. 72%),
- increased persistence among students who met with academic advisors at least twice per semester, and
- positive feedback from students who used accessibility services for extended time during SQL/Python labs.

Community Engagement

Students engage in community-based analytics projects through optional partnerships and required capstone experiences. Collaborations with local nonprofits, municipal agencies, and regional healthcare systems give students the opportunity to analyze real datasets, produce dashboards, and present

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findings to stakeholders. These experiences directly reinforce PLOs related to analytical reasoning, communication, ethical decision-making, and teamwork.

To ensure high-quality learning, faculty apply the Capstone rubric (aligned to all PLOs), collect employer-partner evaluations, and review reflective journals submitted by students. This assessment model ensures that community-engaged learning is not only meaningful but also academically rigorous and aligned with industry standards.

Needs Assessment (For Deans & Academic Leadership)

Several unmet needs directly affect student learning and program stability:

1. Full-Time Faculty Replacement
 - A pending retirement within three years will jeopardize continuity of curriculum, PLO assessment, and employer partnerships.
 - Recommendation: Approve replacement line and advertise early to expand applicant pool.
2. Updated Lab Infrastructure at Satellite Campuses
 - Machines lack sufficient processing power for Python heavy workloads.
 - Recommendation: Upgrade hardware; expand remote compute resources for online learners.
3. Dedicated Technical Tutor for Data Analytics
 - Students report needing specialized support for Python and SQL beyond general tutoring services.
 - Recommendation: Fund a part-time analytics tutor jointly with ITS or STEM departments.
4. Standardization of Adjunct Onboarding
 - Adjunct turnover requires clearer expectations and stronger support systems.
 - Recommendation: Develop a structured onboarding module and shared assignment library.

Highlights

The program benefits from a committed and highly collaborative faculty team, whose professional development efforts consistently translate into curricular improvement. Employer partnerships remain strong due to faculty initiatives, and campus support services significantly enhance student success, especially in the capstone sequence. Students value hands-on engagement with authentic datasets, and community projects have become a signature strength of the program. Despite resource challenges at

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satellite campuses, the program continues to deliver high impact applied learning experiences aligned with workforce and transfer expectations.

Recommendations

To strengthen the program's long-term sustainability and effectiveness, several recommendations emerge:

- Increase faculty diversity through targeted hiring and mentorship initiatives.

Status: *In Progress*

The department worked with Human Resources and Academic Affairs to revise job posting language to emphasize experience with equity-minded analytics, culturally responsive pedagogy, and community-engaged data work. Faculty also participated in inclusive hiring training to mitigate bias during screening and interviews. While no full-time hires occurred this cycle, adjunct recruitment resulted in the addition of one instructor with applied experience in public-sector and community-based analytics. The department will continue to prioritize diversity and cultural competency in future hiring opportunities.

- Prioritize lab infrastructure upgrades and remote computing access to ensure equitable learning.

Status: *Implemented (Partial)*

During the 2024–2025 academic year, the college upgraded analytics software licenses across all campuses, ensuring consistent access to Python libraries and visualization tools. In addition, a cloud-based virtual lab environment was piloted for online and satellite campus students, allowing remote access to high-performance computing resources. Early feedback indicates improved student satisfaction and reduced technical barriers in Python-heavy courses. Full hardware replacement at satellite campuses remains under review due to budget constraints.

- Hire a technical tutor specializing in analytics tools.

Status: *Implemented*

The program successfully partnered with the STEM Center to fund a part-time technical tutor with expertise in SQL, Python, and data visualization. Tutoring services were offered both in person and online, with expanded evening hours to support working students. Usage data showed strong uptake, particularly among first year and online learners, and course success rates improved in DAT 201 and DAT 220. Based on these results, the department plans to request continued funding for this role.

- Develop detailed course transition plans in anticipation of faculty turnover.

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Status: *Implemented*

Faculty developed standardized course transition documents for all core Data Analytics courses. These include shared syllabi templates, aligned learning outcomes, assignment descriptions, and grading rubrics. Materials are stored in a centralized departmental repository accessible to full-time and adjunct faculty. This initiative has strengthened instructional continuity and reduced onboarding time for new instructors, supporting consistent student learning experiences.

- Continue expanding community-engaged learning opportunities with standardized assessment practices.

Status: *No Update*

Although community-engaged learning remains a program strength, no formal expansion occurred this year due to faculty workload capacity and the prioritization of assessment and infrastructure improvements. The department plans to revisit this recommendation once additional faculty capacity or release time becomes available.

- Strengthen adjunct onboarding to ensure consistency in course delivery and PLO alignment.

Status: *No Update*

Progress on adjunct onboarding was delayed as departmental efforts focused on immediate instructional needs and implementing course transition plans. While the onboarding framework has been outlined, full implementation will occur in the next review cycle, aligned with planned adjunct hiring and professional development schedules.

SMART Goals

With what has been learned through the program review cycle, several SMARTIE goals were developed and executed. SMARTIE goals aren't the same as Student Learning Outcomes. While they may include a component of learning, they often are written as an operational outcome for the department. Please consider referencing ["SMART Goals: A How to Guide, created by the University of California"](#) (Retrieved, July 2022) and [SMARTIE Goals: A Powerful Tool for Informing Deliverables](#) (The Management Center). Refer to each SMARTIE goal developed throughout the review (and as indicated on each Annual Report) and provide a status update. You may have included SMARTIE goals throughout this document. If so, simply cut and paste in this section and if applicable guide the reader back to the section if more information pertaining to the goal is shared.

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Year Zero

SMARTIE Goal

Status

Results (if applicable)

Year One

SMARTIE Goal

Status

Results (if applicable)

Year Two

SMARTIE Goal

Status

Results (if applicable)

Year Three

SMARTIE Goal

Status

Results (if applicable)

Year Four

SMARTIE Goal

Status

Results (if applicable)

YEAR Five

SMARTIE Goal

Status

Results (if applicable)