

# Academic Program Assessment Report

**Assessment** is a term commonly used to encompass the process of gathering and using evidence to guide improvements.

SACSCOC requires that an institution "identifies expected outcomes, assesses the extent to which it achieves these outcomes, and provides evidence of seeking improvement based on analysis of the results".

**Be sure to SAVE your progress as you work!**

**Academic Program**

Data Science, B.S.

**Submission Year**

2021-2022

**Assessment Coordinator Name**

Chris Duncan; Gilliean Lee

**Enter Assessment Coordinator Email**

cduncan@lander.edu

## Program Goal

### Goal

#### Goal 1

**Program Goals** are broad and overarching statements about the skills, knowledge, and dispositions students are expected to gain by the end of their course of study (big picture). They support the Institution's Mission/Goals.

#### Program Goal

Students graduating with a B.S. in Data Science will demonstrate an ability to apply computing concepts in order to use, manipulate, and analyze data.

#### Pillar of Success Supported

High-Demand, Market-Driven Programs

## Outcomes

### Outcome 1

**Outcomes** are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

**Most goals have at least two outcomes measured.**

**What type of Outcome would you like to add?**

Student Learning Outcome

**Enter Outcome**

Students will be able to competently perform programming tasks in Data Science programming languages.

**Timeframe for this Outcome**

2023 - 2024 and 2024 - 2025

**Performance Target for "Met"**

70% or more of students in each of DSCI 330, DSCI 340, DSCI 440, and DSCI 499 will score at least 3.5 out of 5 on programming-related components of the final project assessment rubric.

**Performance Target for "Partially Met"**

The target will be consider to be partially met, if it is neither met nor not met.

**Performance Target for "Not Met"**

Less than 60% of students at least one of DSCI 330, DSCI 340, DSCI 440, and DSCI 499 will score at least 3.5 out of 5 on programming-related components of the final project assessment rubric.

**Assessment Measure Used**

Relevant components of the final project assessment rubric.

**Frequency of Assessment**

During each offering of DSCI 330, DSCI 340, DSCI 440, and DSCI 499

**Data Collected for this Timeframe (Results)**

N/A. New outcome

**Score (Met=3, Partially Met=2, Not Met=1)****Comments/Narrative**

No comment. This is the first year of this program and data have yet to be collected.

**Resources Needed to Meet/Sustain Results**

None.

**Explanation of How Resources Will Be Used****Outcome 2**

**Outcomes** are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

**Most goals have at least two outcomes measured.**

**What type of Outcome would you like to add?**

Student Learning Outcome

**Enter Outcome**

Students will demonstrate an understanding of the issues surrounding the acquisition, storage, and use

of large data sets.

**Timeframe for this Outcome**

2023 - 2024 and 2024 - 2025

**Performance Target for "Met"**

70% or more of students in each of DSCI 330, DSCI 340, DSCI 440, and DSCI 499 will score at least 3.5 out of 5 on data acquisition and preprocessing components of the final project assessment rubric.

**Performance Target for "Partially Met"**

The target will be consider to be partially met, if it is neither met nor not met.

**Performance Target for "Not Met"**

Fewer than 60% of students in one or more of DSCI 330, DSCI 340, DSCI 440, and DSCI 499 will score at least 3.5 out of 5 on data acquisition and preprocessing components of the final project assessment rubric

**Assessment Measure Used**

Data acquisition and preprocessing components of the final project assessment rubric.

**Frequency of Assessment**

During each offering of DSCI 330, 340, 440 and 499

**Data Collected for this Timeframe (Results)**

N/A. New outcome

**Score (Met=3, Partially Met=2, Not Met=1)****Comments/Narrative**

No comment. This is the first year of this program and data have yet to be collected.

**Resources Needed to Meet/Sustain Results**

none

**Explanation of How Resources Will Be Used**

## Goal Summary

**Goal Summary/Comments**

None.

**Changes Made/Proposed Related to Goal**

None.

**Upload Rubrics/Other Files**

## Goal 2

**Program Goals** are broad and overarching statements about the skills, knowledge, and dispositions students are expected to gain by the end of their course of study (big picture). They support the Institution's Mission/Goals.

**Program Goal**

Students graduating with a B.S. in Data Science will demonstrate mathematical and statistical understanding of the central algorithms used in the field of data science.

**Pillar of Success Supported**

# Outcomes

## Outcome 1

**Outcomes** are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

**Most goals have at least two outcomes measured.**

**What type of Outcome would you like to add?**

Student Learning Outcome

**Enter Outcome**

Students will be able to explain the role of Linear Algebra in Data Science Algorithms.

**Timeframe for this Outcome**

2022 - 2023

**Performance Target for "Met"**

70% of students in MATH 208 will score at least 3.5 out of 5 on Data Science-related test/exam items.

**Performance Target for "Partially Met"**

60% - 69% of students in MATH 208 will score at least 3.5 out of 5 on Data Science-related test/exam items.

**Performance Target for "Not Met"**

Less than 60% of students in MATH 208 will score at least 3.5 out of 5 on Data Science-related test/exam items.

**Assessment Measure Used**

Tests and Exams in MATH 208

**Frequency of Assessment**

Annually.

**Data Collected for this Timeframe (Results)**

N/A. New outcome

**Score (Met=3, Partially Met=2, Not Met=1)**

**Comments/Narrative**

No comment. This is the first year of this program and data have yet to be collected.

**Resources Needed to Meet/Sustain Results**

None

**Explanation of How Resources Will Be Used**

## Outcome 2

**Outcomes** are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

**Most goals have at least two outcomes measured.**

**What type of Outcome would you like to add?**

Student Learning Outcome

**Enter Outcome**

Students will be able to explain the statistical foundations of both supervised and unsupervised machine learning.

**Timeframe for this Outcome**

2023 - 2024

**Performance Target for "Met"**

70% of students in MATH 213 and MATH 214 will score at least 3.5 out of 5 on Data Science-related test/exam items.

**Performance Target for "Partially Met"**

The target will be consider to be partially met, if it is neither met nor not met.

**Performance Target for "Not Met"**

Less than 60% of students in MATH 213 and MATH 214 will score at least 3.5 out of 5 on Data Science-related test/exam items.

**Assessment Measure Used**

Relevant components of the assessment rubric.

**Frequency of Assessment**

During each offering of MATH 213 and 214

**Data Collected for this Timeframe (Results)**

N/A. New outcome

**Score (Met=3, Partially Met=2, Not Met=1)**

**Comments/Narrative**

None

**Resources Needed to Meet/Sustain Results**

None

**Explanation of How Resources Will Be Used**

## Outcome 3

**Outcomes** are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge,

skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

**Most goals have at least two outcomes measured.**

**What type of Outcome would you like to add?**

Student Learning Outcome

**Enter Outcome**

Students will be able to both select and justify the selection of a model to be used in a variety of data science tasks.

**Timeframe for this Outcome**

2023 - 2024

**Performance Target for "Met"**

70% of students in MATH 213 and MATH 214 will score at least 3.5 out of 5 on Data Science-related test/exam items.

**Performance Target for "Partially Met"**

The target will be consider to be partially met, if it is neither met nor not met.

**Performance Target for "Not Met"**

Less than 60% of students in MATH 213 and MATH 214 will at least 3.5 out of 5 on Data Science-related test/exam items.

**Assessment Measure Used**

Relevant components of the assessment rubric

**Frequency of Assessment**

During every offering of MATH 213 and MATH 214

**Data Collected for this Timeframe (Results)**

No data is available until the time frame listed above

**Score (Met=3, Partially Met=2, Not Met=1)**

**Comments/Narrative**

N/A. New outcome

**Resources Needed to Meet/Sustain Results**

None

**Explanation of How Resources Will Be Used**

## Goal Summary

**Goal Summary/Comments**

None

**Changes Made/Proposed Related to Goal**

None

## Upload Rubrics/Other Files

### Goal 3

**Program Goals** are broad and overarching statements about the skills, knowledge, and dispositions students are expected to gain by the end of their course of study (big picture). They support the Institution's Mission/Goals.

#### Program Goal

Students graduating with a B.S. in Data Science will demonstrate the ability to communicate results of data analyses including data visualization.

#### Pillar of Success Supported

High-Demand, Market-Driven Programs

## Outcomes

### Outcome 1

**Outcomes** are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

**Most goals have at least two outcomes measured.**

#### What type of Outcome would you like to add?

Student Learning Outcome

#### Enter Outcome

Students will be able to produce technical reports, delivered orally and in writing, summarizing the results of data analysis.

#### Timeframe for this Outcome

2023 - 2024 and 2024 - 2025

#### Performance Target for "Met"

70% or more of students in each of DSCI 231 and DSCI 499 will score at least 3.5 out of 5 on oral and written technical communication components of the final project assessment rubric.

#### Performance Target for "Partially Met"

The target will be consider to be partially met, if it is neither met nor not met.

#### Performance Target for "Not Met"

Less than 60% of students in at least one of DSCI 231 and DSCI 499 will score at least 3.5 out of 5 on oral and written technical communication components of the final project assessment rubric.

#### Assessment Measure Used

Oral and written technical communication

#### Frequency of Assessment

During each offering of DSCI 231 and DSCI 499

components of the final project rubric

**Data Collected for this Timeframe (Results)**

N/A. New outcome. See time frame above

**Score (Met=3, Partially Met=2, Not Met=1)**

**Comments/Narrative**

No comment. This is the first year of this program and data have yet to be collected.

**Resources Needed to Meet/Sustain Results**

None

**Explanation of How Resources Will Be Used**

## Outcome 2

**Outcomes** are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

**Most goals have at least two outcomes measured.**

**What type of Outcome would you like to add?**

Student Learning Outcome

**Enter Outcome**

Students will be able to communicate the results of data analyses to a non-technical audience as a means of informing decision-making.

**Timeframe for this Outcome**

2023 - 2024 and 2024 - 2025

**Performance Target for "Met"**

70% or more of students in each of DSCI 231 and DSCI 499 will score at least 3.5 out of 5 on oral and written non-technical communication components of the final project assessment rubric.

**Performance Target for "Partially Met"**

The target will be consider to be partially met, if it is neither met nor not met.

**Performance Target for "Not Met"**

Less than 60% of students at least one of DSCI 231 and DSCI 499 will score at least 3.5 out of 5 on oral and written non-technical communication components of the final project assessment rubric.

**Assessment Measure Used**

Oral and written technical communication components of the final project rubric

**Frequency of Assessment**

During each offering of DSCI 231 and DSCI 499

**Data Collected for this Timeframe (Results)**

**Score (Met=3, Partially Met=2, Not Met=1)**

N/A. New outcome. See timeframe above

**Comments/Narrative**

No comment. This is the first year of this program and data have yet to be collected.

**Resources Needed to Meet/Sustain Results**

None

**Explanation of How Resources Will Be Used**

None

## Goal Summary

**Goal Summary/Comments**

None

**Changes Made/Proposed Related to Goal**

None

**Upload Rubrics/Other Files**

## Goal 4

**Program Goals** are broad and overarching statements about the skills, knowledge, and dispositions students are expected to gain by the end of their course of study (big picture). They support the Institution's Mission/Goals.

**Program Goal**

Students graduating with a B.S. in Data Science will apply data analyses in real-world scenarios in order to inform decision-making.

**Pillar of Success Supported**

High-Demand, Market-Driven Programs

## Outcomes

### Outcome 1

**Outcomes** are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

**Most goals have at least two outcomes measured.**

**What type of Outcome would you like to add?**

Student Learning Outcome

**Enter Outcome**

Students will be able to gain insights from data and evaluate results from data analysis in real-world

scenarios.

**Timeframe for this Outcome**

2024-2025

**Performance Target for "Met"**

70% or more of students in DSCI 499 will score at least 3.5 out of 5 on relevant components of the final project assessment rubric.

**Performance Target for "Partially Met"**

Between 60% and 69% of students in DSCI 499 will score at least 3.5 out of 5 on relevant components of the final project assessment rubric.

**Performance Target for "Not Met"**

Less than 60% of students in DSCI 499 will score at least 3.5 out of 5 on relevant components of the final project assessment rubric.

**Assessment Measure Used**

Relevant components of the final project assessment rubric.

**Frequency of Assessment**

During each offering of DSCI 499

**Data Collected for this Timeframe (Results)**

N/A. New outcome. See timeframe above.

**Score (Met=3, Partially Met=2, Not Met=1)****Comments/Narrative**

No comment. This is the first year of this program and data have yet to be collected.

**Resources Needed to Meet/Sustain Results**

None

**Explanation of How Resources Will Be Used**

## Outcome 2

**Outcomes** are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

**Most goals have at least two outcomes measured.**

**What type of Outcome would you like to add?**

Student Learning Outcome

**Enter Outcome**

Students will apply methods and models to answer real-world, data science questions.

**Timeframe for this Outcome**

2024 - 2025

**Performance Target for "Met"**

70% or more of students in DSCI 499 will score at least 3.5 out of 5 on relevant components of the final project assessment rubric.

**Performance Target for "Partially Met"**

Between 60% and 69% of students in DSCI 499 will score at least 3.5 out of 5 on relevant components of the final project assessment rubric.

**Performance Target for "Not Met"**

Less than 60% of students in DSCI 499 will score at least 3.5 out of 5 on relevant components of the final project assessment rubric.

**Assessment Measure Used**

Relevant components of the final project assessment rubric.

**Frequency of Assessment**

During each offering of DSCI 499

**Data Collected for this Timeframe (Results)**

N/A. New outcome. See timeframe above.

**Score (Met=3, Partially Met=2, Not Met=1)**

**Comments/Narrative**

No comment. This is the first year of this program and data have yet to be collected.

**Resources Needed to Meet/Sustain Results**

None

**Explanation of How Resources Will Be Used**

## Goal Summary

**Goal Summary/Comments**

None

**Changes Made/Proposed Related to Goal**

None

**Upload Rubrics/Other Files**

### Goal 5

**Program Goals** are broad and overarching statements about the skills, knowledge, and dispositions students are expected to gain by the end of their course of study (big picture). They support the Institution's Mission/Goals.

**Program Goal**

Students graduating a B.S. degree in Data Science will demonstrate the ability to develop a high-performance machine learning and deep learning system using a large data set.

**Pillar of Success Supported**

High-Demand, Market-Driven Programs

# Outcomes

## Outcome 1

**Outcomes** are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

**Most goals have at least two outcomes measured.**

**What type of Outcome would you like to add?**

Student Learning Outcome

**Enter Outcome**

Students will be able to develop machine learning and deep learning models and systems by using an appropriate programming language and large data sets.

**Timeframe for this Outcome**

2023 - 2024 and 2024 - 2025

**Performance Target for "Met"**

70% or more of students in each of DSCI 340, DSCI 440, and DSCI 499 will score at least 3.5 out of 5 on relevant components of the final project assessment rubric.

**Performance Target for "Partially Met"**

The target will be consider to be partially met, if it is neither met nor not met.

**Performance Target for "Not Met"**

Less than 60% of students in one of DSCI 340, DSCI 440, and DSCI 499 will score at least 3.5 out of 5 on relevant components of the final project assessment rubric.

**Assessment Measure Used**

Relevant components of the final project assessment rubric.

**Frequency of Assessment**

During each offering of DSCI 340, 440, and 449

**Data Collected for this Timeframe (Results)**

N/A. New outcome. See timeframe above.

**Score (Met=3, Partially Met=2, Not Met=1)**

**Comments/Narrative**

None

**Resources Needed to Meet/Sustain Results**

None

**Explanation of How Resources Will Be Used**

## Outcome 2

**Outcomes** are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

**Most goals have at least two outcomes measured.**

**What type of Outcome would you like to add?**

Student Learning Outcome

**Enter Outcome**

Students will be able to assess and fine-tune the performance of machine learning and deep learning models and systems.

**Timeframe for this Outcome**

2023 - 2024 and 2024 - 2025

**Performance Target for "Met"**

70% or more of students in each of DSCI 340, DSCI 440, and DSCI 499 will score at least 3.5 out of 5 on relevant components of the final project assessment rubric.

**Performance Target for "Partially Met"**

The target will be consider to be partially met, if it is neither met nor not met.

**Performance Target for "Not Met"**

Less than 60% of students in one of DSCI 340, DSCI 440, and DSCI 499 will score at least 3.5 out of 5 on relevant components of the final project assessment rubric.

**Assessment Measure Used**

Relevant components of the final project assessment rubric.

**Frequency of Assessment**

During each offering of DSCI 340, 440, and 449

**Data Collected for this Timeframe (Results)**

N/A. New outcome. See timeframe above.

**Score (Met=3, Partially Met=2, Not Met=1)**

**Comments/Narrative**

No comment. This is the first year of this program and data have yet to be collected.

**Resources Needed to Meet/Sustain Results**

None

**Explanation of How Resources Will Be Used**

## Goal Summary

### Goal Summary/Comments

None

### Changes Made/Proposed Related to Goal

None

### Upload Rubrics/Other Files

## Goal 6

**Program Goals** are broad and overarching statements about the skills, knowledge, and dispositions students are expected to gain by the end of their course of study (big picture). They support the Institution's Mission/Goals.

### Program Goal

Students graduating a B.S. degree in Data Science will demonstrate ethical principles of data science in building data sets and using them in data science applications including machine learning systems

### Pillar of Success Supported

High-Demand, Market-Driven Programs

## Outcomes

### Outcome 1

**Outcomes** are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

**Most goals have at least two outcomes measured.**

### What type of Outcome would you like to add?

Student Learning Outcome

### Enter Outcome

Students will be able to collect and/or build a data set that provides equity and fairness, or acknowledge the shortcoming of the data set.

### Timeframe for this Outcome

2023 - 2024 and 2024 - 2025

### Performance Target for "Met"

70% or more of students in each of DSCI 340, DSCI 440, and DSCI 499 will score at least 3.5 out of 5 on relevant components of the final project assessment rubric.

### Performance Target for "Partially Met"

The target will be consider to be partially met, if it is neither met nor not met.

**Performance Target for "Not Met"**

Less than 60% of students in one of DSCI 340, DSCI 440, and DSCI 499 will score at least 3.5 out of 5 on relevant components of the final project assessment rubric.

**Assessment Measure Used**

Relevant components of the final project assessment rubric.

**Frequency of Assessment**

During each offering of DSCI 340, 440, and 499

**Data Collected for this Timeframe (Results)**

N/A. New outcome. See timeframe above.

**Score (Met=3, Partially Met=2, Not Met=1)****Comments/Narrative**

No comment. This is the first year of this program and data have yet to be collected.

**Resources Needed to Meet/Sustain Results**

None

**Explanation of How Resources Will Be Used**

None

## Outcome 2

**Outcomes** are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

**Most goals have at least two outcomes measured.**

**What type of Outcome would you like to add?**

Student Learning Outcome

**Enter Outcome**

Students will be able to develop a non-discriminatory system that provides equability and fairness, or acknowledge the shortcoming of the system.

**Timeframe for this Outcome**

2023 - 2024 and 2024 - 2025

**Performance Target for "Met"**

70% or more of students in each of DSCI 340, DSCI 440, and DSCI 499 will score at least 3.5 out of 5 on relevant components of the final project assessment rubric.

**Performance Target for "Partially Met"**

The target will be consider to be partially met, if it is neither met nor not met.

**Performance Target for "Not Met"**

Less than 60% of students in one of DSCI 340, DSCI 440, and DSCI 499 will score at least 3.5 out of 5

on relevant components of the final project assessment rubric.

**Assessment Measure Used**

Relevant components of the final project assessment rubric.

**Frequency of Assessment**

During each offering of DSCI 340. 440, and 499

**Data Collected for this Timeframe (Results)**

N/A. New outcome. See timeframe above.

**Score (Met=3, Partially Met=2, Not Met=1)**

**Comments/Narrative**

No comment. This is the first year of this program and data have yet to be collected.

**Resources Needed to Meet/Sustain Results**

None

**Explanation of How Resources Will Be Used**

## Goal Summary

**Goal Summary/Comments**

There are no results as this is the first year of the program.

**Changes Made/Proposed Related to Goal**

N/A

**Upload Rubrics/Other Files**

**Dean's Email Address**

dslimmer@lander.edu

**Approved by Dean?**

Yes

**Signature of Dean**

David A. Slimmer

**Comments from Dean's Review**

We look forward to having data for this assessment as students matriculate through the program.

**Thank you for reviewing and approving this report. The approval and a copy of the report will be emailed to you and the Assessment Coordinator.**